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THE
Resources
AND
Attractions
OF
UTAH.

By O. J. HOLLISTER.

PUBLISHED BY
A. ZEEHANDELAAR,
Secretary and Special Agent for Utah at Denver Exposition.

1882.

Tribune Printing and Publishing Co., Salt Lake City.

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THE

RESOURCES AND ATTRACTIONS

25706

OF

UTAH.

vando
By O. J. HOLLISTER.

PUBLISHED BY
A. ZEEHANDELAAR,
SECRETARY AND SPECIAL AGENT FOR UTAH AT DENVER EXPOSITION.

SALT LAKE CITY:
TRIBUNE PRINTING AND PUBLISHING CO.
1882.

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THE RESOURCES AND ATTRACTIONS OF UTAH.

GENERAL VIEW.

Utah Territory is in the latitude of Virginia and Missouri, between the 37th and 42d parallels north, and about two-thirds of the way from St. Louis to San Francisco, between the 109th and 114th meridians west from Greenwich. Idaho Territory bounds it on the north, Colorado on the east, Arizona Territory on the south, and Nevada on the west. It has a maximum length of 325 miles by a breadth of 300. Its land area is 84,970 square miles (52,601,600 acres), water area, 2,780 square miles (1,779,200 acres). Only that which can be artificially watered is really arable. The Wasatch Mountains bisect it from north to south, dividing it into two substantially equal parts. Of the part lying east of this range and drained by the Green and Colorado rivers and their tributaries, little use has yet been made. It is mountainous, its valleys are about a mile above tide-water, it has a little arable and considerable grazing land, with a great deal of coal on the slopes of the mountains where there has not been too much erosion. The settlements are few and small. The Denver & Rio Grande Western Railway Company is now constructing a railroad through it, joining Salt Lake and Denver, which will make it accessible and its resources available.

The settled parts lie along the western base of the Wasatch Mountains, between them and Salt Lake and Utah Lake, in Cache, Sanpete and other valleys; wherever indeed, a stream flashes into the sunshine from the gloom of mountain gorge, is caught and trailed in a thousand rills upon the thirsty land. Salt Lake Basin extends 200 miles, from south of Nephi to Bear River Gates. It includes Salt Lake and Utah Lake, has the general altitude of the Alleghany Mountains, and is the paradise of the farmer, the horticulturist, and the fruit-grower. Cache Valley lies to the northeast, Sanpete Valley to the southeast of Salt Lake Valley. They are noted grain-producing sections, but having colder winters and shorter seasons are not so well adapted to fruit growing as Salt Lake Basin. The Sevier River rises in Panguitch Lake, far south, and flows northward, finally breaking out of the mountains and losing itself in the sink of Sevier Lake. Its upper course is settled, wherever tributaries enter from the mountains on either hand.

The western one-third of Utah is mountain, desert, sink, and salt lake, with few oases of grazing or of possible arable land. In the northern part of the Territory the Wasatch is high and massive, there is great accumulation of snow in winter, and the streams are correspondingly large and numerous. In the southern part, while the Range is not much lower or less in mass, it is warmer and there is little snow, smaller and fewer streams, and more desert in proportion. The isolated ranges in the Great Basin give rise to no streams of importance, and the valleys are largely desert. Many of them are underlaid, so to speak, with inexhaustible water, however, which will some day be reached by wells, and used to transform them into gardens. Nearly all of the mountains appear to be mineral-bearing, and enough water can usually be had for mining purposes.

POPULATION.

The population of Utah, (organized as a Territory Sept. 9, 1850), by counties, by the respective censuses since taken, is shown in the following table:

COUNTIES.	1880	1870	1860	1850	REMARKS.
Beaver	3,918	2,007	785	....	
Box Elder	6,761	4,855	1,608	....	In 1880, part from Salt Lake
Cache	12,562	8,229	2,605	....	
Cedar	....	....	741	....	No records by which to account for its disappearance
Davis	5,279	4,459	2,904	1,134	In 1880, part from Salt Lake.
Emery	556	....	....	....	In 1880, from parts of Sanpete, Sevier, and Wasatch.
Green River	....	....	141	....	Now in Wyoming Territory.
Iron	4,013	2,277	1,010	360	In 1880, part to San Juan.
Juab	3,474	2,034	672	....	
Kane	3,085	1,513	....	....	In 1880, part to San Juan.
Millard	3,727	2,753	715	....	
Morgan	1,783	1,972	....	....	
Piute	1,651	82	....	....	In 1880, part to San Juan.
Rich	1,263	1,955	....	....	
Rio Virgen	....	450	....	....	In 1871, part set off to the State of Nevada; in 1872, remainder to Washington Co.
Salt Lake	31,977	18,337	11,295	6,157	In 1880, parts to Box Elder, Davis, Weber.
San Juan	204	....	....	....	In 1880, from parts of Kane, Iron, Piute
Sanpete	11,557	6,786	3,815	365	In 1880, parts to Emery, Uintah, Wasatch.
Sevier	4,457	19	....	....	In 1880, part to Emery.
Shambip	....	....	162	....	Absorbed by Juab, Tooele, and Utah.
Summit	4,921	2,512	198	....	
Tooele	4,497	2,1[illegible]	1,008	152	In 1880, part from Salt Lake.
Uintah	799	....	....	....	In 1880, from parts of Sanpete, Wasatch.
Utah	17,973	12,203	8,248	2,026	In 1880, boundaries changed
Wasatch	2,927	1,244	....	....	In 1880, parts to Emery and Uintah, part from Sanpete
Washington	4,235	3,064	691	....	In 1872, part of Rio Virgen annexed.
Weber	12,344	7,858	3,675	1,186	In 1880, part of Salt Lake annexed.
Territory	143,963	86,786	40,273	11,380	

The excess of males, by the last census, was seven per cent.; foreign born, 43,994; native, 99,969; born in Utah, 80,847. England, Denmark, Sweden, Scotland, Wales, Ireland, Norway, Switzerland, Canada and the German Empire contributed in the order named to the foreign-born population, England furnishing nearly one-half of them. Assuming the same rate of increase for this as for the last census decade, to wit: sixty-five per cent., or an increase of 5.315 per cent. per year, the population in June of each year will be as follows:

Year.	Increase.	Populat'n.	Year.	Increase	Populat'n.
June, 1880		143,963	June, 1886	9,496	194,420
June, 1881	7,393	151,356	June. 1887	9,984	205,404
June, 1882	7.772	159,128	June, 1888	10,496	214,900
June, 1883	8,173	167,301	June, 1889	11.035	225,935
June, 1884	8,591	175,892	June, 1890	11,602	237,537
June, 1885	9,032	184,924			

GEOLOGY.

The greater part of the rock of the interior mountain area is a series of conformably stratified beds* reaching from the early Azoic to the late Jurassic times. In the latter these beds were raised, the Sierras, the Wasatch, and the parallel ranges of the

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* Clarence King's Explorations 40th Parallel.

Great Basin were the consequence. In this upheaval important masses of granite broke through, accompanied by quartz, porphyries, felsite rocks, and notably sienitic granite with some granulite and gretsen occasionally. Then the Pacific Ocean on west, and the ocean that filled the Mississippi Basin on the east, laid down a system of Cretaceous and Tertiary strata. These outlying shore beds, subsequently to the Miocene, were themselves raised and folded, forming the Pacific Coast range and the chains east of the Wasatch; volcanic rocks accompanying this upheaval as granite did the former one. Still later a final series of disturbances occurred, but these last had but small connection with the region under consideration.

There is a general parallelism of the mountain chains, and all the structural features of local geology, the ranges, strike of great areas of upturned strata, larger outbursts of gigantic rocks, etc., are nearly parallel with the meridian. So the precious metals arrange themselves in parallel longitudinal zones. There is a zone of quicksilver, tin, and chromic iron on the coast ranges; one of copper along the foot-hills of the Sierras; one of gold further up the Sierras—the gold veins and resultant placers extending far into Alaska; one of silver with comparatively little base metal, along the east base of the Sierras, stretching into Mexico; silver mines with complicated associations through Middle Mexico, Arizona, Middle Nevada, and Central Idaho; argentiferous galena through New Mexico, Utah, and Western Montana; and still further east, a continuous chain of gold deposits in New Mexico, Colorado, Wyoming, and Montana. The Jurassic disturbance in all probability is the dating point of a large class of lodes: *a*, those wholly enclosed in the granites, and *b*, those in metamorphic beds of the series extending from the Azoic to the Jurassic. To this period may be referred the gold veins of California, those of the Humboldt mines, and those of White Pine, all of class *b*; and the Reese River veins, partly *a*, and partly *b*. The Colorado lodes are somewhat unique, and in general belong to the ancient type. To the Tertiary period may be definitely assigned the mineral veins traversing the early volcanic rock; as the Comstock Lode and veins of the Owyhee District, Idaho. By far the greater number of metalliferous lodes occur in the stratified metamorphic rocks or the ancient eruptive rocks of the Jurassic upheaval; yet very important, and, perhaps, more wonderfully productive, have been those silver lodes which lie wholly in the recent volcanic formations.

CLIMATE.

The climate of a mountainous country like Utah will vary considerably with its varying altitudes and exposures. In the lower inhabited valleys it is agreeable and salubrious. The air is dry, elastic, transparent, and bracing. The range of temperature and amount of precipitation can be studied from the following table, prepared from the records of Sergeant Craig, of the United States Signal Service, stationed at Salt Lake City:

JANUARY.

	TEMPERATURE.								PR'CIPIT'N.		
Years.	Highest Temperature.	Lowest Temperature.	Monthly Range.	Monthly Mean.	Mean of the Maxim. Temperatures.	Mean of the Minim. Temperatures.	Ext'me D'ly Variat'n.	Mean Daily Variation	Mean Rel. Humidity.	Rainfall—inches.	Stormy Days.
1875	51	5	46	29.3	37.8	21.1	26	16.7	61.8	3.05	18
1876	48	7	41	30.4	37.8	22.8	25	15.0	67.9	1.23	12
1877	50	3	47	27.9	35.3	19.0	21	16.3	74.9	0.87	10
1878	52	5	47	30.0	38.6	22.0	26	18.6	64.8	1.07	7
1879	54	4	50	28.7	36.6	20.0	23	16.6	63.6	1.87	15
1880	45	2	43	28.8	36.2	20.1	25	16.1	45.5	0.29	7
1881	51	20	31	32.1	38.0	25.6	24	12.5	48.0	1.24	18
Av.				29.6	37.2	21.5		15.9	60.9	1.37	12½

FEBRUARY.

1875	56	17	39	33.7	42.5	25.8	27	16.5	52.9	0.79	6
1876	57	13	44	35.5	44.2	28.1	25	16.1	59.5	1.52	9
1877	55	15	40	33.3	41.6	26.0	22	15.5	75.3	0.38	5
1878	60	20	40	37.3	45.6	29.9	26	15.6	66.2	3.49	16
1879	68	8	60	39.8	47.5	32.0	27	15.5	49.0	0.71	11
1880	45	3	42	26.9	34.6	17.6	25	17.0	49.4	1.02	13
1881	63	14	49	38.2	45.4	30.9	25	14.5	51.9	2.44	14
Av				34.9	43.1	27.2		15.9	57.7	1.48	10½

MARCH.

1875	66	15	51	35.2	44	26.0	35	18.0	50.0	2.81	15
1876	65	18	47	37.9	47.2	30.1	31	17.0	50.9	4.00	15
1877	73	31	42	48.0	57.9	39.4	34	18.4	52.9	2.93	12
1878	73	27	46	46.6	57.1	37.1	28	20.0	52.6	2.54	9
1879	77	28	49	49.8	60.1	38.2	33	21.9	34.9	0.67	9
1880	62	5	57	33.7	43.4	24.6	32	18.8	42.4	0.43	15
1881	72	25	47	41.9	51.2	33.0	28	18.1	39.6	0.88	12
Av				41.9	51.4	32.6		18.8	46.2	2.04	12½

APRIL.

1875	79	19	60	50.3	59.2	38.6	34	20.6	41.3	1.50	8
1876	79	26	53	50.3	60.5	39.1	34	21.4	40.4	2.09	8
1877	70	30	40	48.6	58.5	39.2	30	19.3	43.0	2.14	7
1878	73	30	43	49.8	59.3	39.6	29	19.7	43.4	2.63	9
1879	74	30	44	53.6	63.2	42.0	34	21.2	48.3	3.26	11
1880	75	27	48	47.1	56.4	37.3	33	19.1	44.1	2.87	14
1881	75	30	45	54.5	64.1	44.3	30	19.8	41.7	2.37	10
Av				50.6	60.1	40.0		20.1	41.7	2.34	9½

MAY.

1875	85	38	47	60.1	71.2	46.9	35	24.3	37.5	2.91	11
1876	88	33	55	56.9	68.1	45.2	35	22.9	47.7	4.30	10
1877	83	34	49	56.7	67.1	44.9	35	22.2	42.1	3.49	8
1878	83	34	49	56.2	67.9	45.0	33	22.9	39.0	2.50	8
1879	84	35	49	59.6	69.5	46.9	36	22.6	26.4	0.10	4
1880	80	32	48	55.1	64.7	43.7	34	21.0	37.6	1.85	13
1881	86	40	46	61.5	71.5	49.1	33	22.4	33.8	2.55	6
Av				58.0	68.6	45.9		22.7	37.7	2.53	8½

JUNE.

1875	93	37	56	69.1	81.2	54.6	40	26.6	28.9	.90	5
1876	94	42	52	69.9	81.2	56.5	35	24.8	32.7	.09	1
1877	90	43	47	65.9	77.7	53.2	33	24.5	29.7	.80	5
1878	93	45	48	69 4	80.6	56.4	35	24.2	30.7	.35	4
1879	94	42	52	66.4	77.9	53.1	11	24.8	31.9	1.34	9
1880	93	40	53	67.5	78.8	53.3	36	25.5	24.7	.01	4
1881	96	47	49	71.6	83.5	58.7	34	24.8	26.5	.28	5
Av				68.5	80.1	55.1		25.0	29.3	.54	5

JULY.

TEMPERATURE.								P'CIPIT'N		
Highest Temperature.	Lowest Temperature.	Monthly Range.	Monthly Mean.	Mean of the Maxim. Temperatures.	Mean of the Minim. Temperatures.	Ext'me D'ly Variation	Mean Daily Variation.	Mean Rel. Humidity.	Rainfall—inches.	Stormy Days.
97	53	44	74.7	85.9	62.1	34	23.8	30.0	.00	0
97	52	45	76.9	89.2	63.2	36	26.0	30.2	.83	7
98	50	48	78.2	89.5	65.4	35	24.1	24.1	.02	1
96	52	44	77.7	90.5	63.3	40	27.3	26.2	1.08	2
97	55	42	78.4	89.7	63.9	32	25.8	20.8	.07	3
95	45	50	75.3	85.8	62.5	33	23.3	24.4	.20	5
96	46	50	74.9	87.1	64.7	36	22.4	39.8	.21	9
			76.4	88.2	63.6		24.6	27.9	.34	4

AUGUST.

101	48	53	76.2	86.7	63.3	31	23.4	23.1	.25	4
95	46	49	72.6	84.6	58.6	36	25.9	29.3	.92	4
96	53	43	76.3	88.3	62.9	35	25.3	25.1	.28	3
97	60	37	78.5	90.2	66.7	32	23.5	33.7	.81	7
95	46	49	76.2	87.3	63.4	33	23.9	21.9	.06	4
94	44	50	73.5	84.4	61.3	31	23.1	25.2	.74	4
100	48	52	73.1	85.1	63.6	34	21.5	40.1	1.61	8
			75.2	86.6	62.8		23.8	28.3	.67	5

SEPTEMBER.

93	46	47	68.8	80.1	56.2	29	23.9	31.1	1.22	3
90	45	45	65.6	77.5	53.9	34	23.6	28.8	.42	3
90	42	48	65.0	76.4	52.4	38	24.0	31.5	.90	6
92	38	54	60.5	72.0	49.8	36	22.1	37.0	3.15	8
91	45	46	68.8	81.5	55.5	35	26.0	17.8	.01	2
88	39	49	64.1	74.8	52.3	33	22.5	28.7	.56	4
87	36	51	59.8	71.1	49.3	32	21.8	28.4	.43	3
			64.7	76.2	52.8		23.4	29.3	.95	4

OCTOBER.

79	33	46	59.3	67.6	46.5	30	21.1	31.6	1.36	3
83	30	53	54.6	64.9	45.6	30	19.3	47.3	3.27	11
80	25	55	51.0	60.4	42.5	31	17.9	41.0	2.41	11
78	22	56	48.5	59.8	38.2	34	21.5	44.5	1.39	6
82	33	49	51.8	62.8	42.3	35	20.5	39.9	1.62	6
77	27	50	51.5	62.8	41.1	30	21.7	30.9	.40	4
82	25	57	50.2	60.3	41.4	32	18.9	38.2	2.19	9
			52.4	62.6	42.5		20.1	39.1	1.81	7

NOVEMBER.

68	28	40	41.9	49.9	35.2	28	14.7	60.4	2.03	13
62	23	39	40.5	49.6	32.3	28	17.3	53.6	1.80	8
60	15	45	40.1	49.2	32.0	24	17.2	55.4	1.11	7
68	22	46	42.7	53.8	34.5	29	19.3	54.6	.11	3
67	15	52	36.6	43.9	28.1	28	15.8	47.6	3.08	20
58	3	55	30.3	38.0	21.1	25	16.8	37.5	1.90	17
56	13	43	33.5	41.2	26.3	25	14.9	47.2	1.24	9
			37.9	46.5	29.9		16.6	50.9	1.61	11

DECEMBER.

55	9	46	35.5	42.9	29.3	20	13.6	70.0	2.03	13
45	13	32	26.6	33.5	20.6	20	12.9	89.2	1.80	8
51	8	43	31.7	40.5	23.7	24	16.8	68.1	1.11	7
56	8	48	29.7	39.0	21.1	24	17.9	50.1	.11	3
52	*	62	29.8	36.3	22.8	23	13.5	56.1	3.08	20
49	17	32	34.3	40.5	28.7	19	11.8	55.3	1.90	17
49	17	32	32.0	39.5	27.8	18	11.7	52.4	1.24	9
			31.2	38.9	2.49	_	14.0	64.3	1.61	11

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* 10 deg. below zero.

In these seven years there were two months in the winters, five in the springs, eight in the falls, and ten in the summers when the monthly range exceeded 50°, twenty-five months out of eighty-four. The extreme daily variation is greatest in summer; spring, fall, and winter following as named. An abstract of the monthly mean of diurnal variation at Fort Douglas, on the bench about 500 feet above Salt Lake, shows the mean temperature of June to September inclusive, at 2 P. M., to be 79°; at 9 P. M., 57; difference, 22°; mean percentage of sick for these months, 24.63. For the other eight months, the mean at 2 P. M. was 47°; at 9 P. M., 36°; difference, 11°; mean percentage of sick for these months, 32.63. This seems to indicate that the months of greatest diurnal variation are the healthiest months ; and it is believed that they are so, generally, in Utah, unless from some local cause, as bad water, or drainage, or exposure. Those who have to swelter through many nights in a season with the thermometer between 80° and 90°, will appreciate the significance of the mean temperature of the four hottest months at Fort Douglas being but 57° at 9 P. M.

ANNUAL RANGE.

The following table is from observations made by the Fort Douglas garrison for the first twelve years, and by the Signal Service officer at Salt Lake for the last seven years:

YEARS.	TEMPERATURE.				PRCP'N
	Mean.	Max.	Min.	R'ge.	Inches.
1863	52.93	103	7	96	7.47
1864	52.22	97	-4	101	14.92
1865	50.11	100	6	94	15.51
1866	51.87	94	9	85	22.29
1867	52.71	95	0	95	26.14
1868	50.66	96	5	91	17.25
1869	53.61	97	7	90	22.32
1870	51.66	96	4	92	20.96
1871	53.09	104	8	96	23.12
1872	50.42	91	0	91	18.12
1873	49.26	98	-3	99	17.37
1874	50.18	97	8	89	19.55
1875	51.26	101	5	96	21.07
1876	50.64	97	7	90	18.31
1877	51.00	98	3	95	14.52
1878	51.29	97	5	92	17.86
1879	53.20	97	-10	107	13.11
1880	54.00	95	2	93	10.94
1881	51.54	100	13	87	16.88
Mean for Nineteen Years	51.54				15.72

Amongst the highest observed temperatures are 121° at Fort Miller, California, and 132° in India ; while the thermometer has been known to fall to 76° below zero in Siberia, and to 40° below in some parts of the United States.* At places in the East and West Indies, the entire annual range of the thermometer is 14°; at Montreal it is 140°; at New York, 114°; at St. Louis, 133°; at Chicago, 132°; at Denver, 126°. At Salt Lake City, as will be seen, it has exceeded 100° but twice in nineteen years. It has gone to 100° to 104° five times in those years, and to 3° to 10° below three times. The range has been less than 90° in that time oftener than it has been 100° or more.

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* Loomis.

ANNUAL AND SEASONAL MEANS.

SEASONS.	TEMPERATURE.				PRECIPITATION.		
	Mean of Season.	Mean of the Max. Temperatures.	Mean of the Min. Temperatures.	Mean Daily Variation.	Mean Relative Humidity.	Snow and Rainfall, Inches.	Days on which Snow or Rain fell.
Spring.............	50.2	60.0	39.5	20.5	41.9	6.91	30.5
Summer............	7 .4	85.0	60.5	24.5	28.5	1.55	14.0
Fall................	51.7	61.8	41.7	2 .0	39.8	4.37	22.0
Winter	31.9	39.7	24.9	15.3	60.9	4.46	34.0
Annual	51.8	61.6	41.6	20.0	42.8	17.29	10 .5

The annual mean of Salt Lake City places it very near the isothermal line of 50°, which crosses nearly 15° of latitude on each continent, owing to the influences of oceans, winds and elevations, starting on Puget's Sound and passing near or through Salt Lake City, Santa Fe, Denver, Burlington, Pittsburgh, New Haven, Dublin, Brussels, Vienna, and Pekin. The summer and winter means describe the same undulations in traversing the continents, and they are more indicative of the climate in its relations to animal and vegetable life than the annual mean. The mean annual temperature of New York and Liverpool are the same, yet throughout England the heat of summer is insufficient to ripen Indian corn, while the ivy, which grows luxuriantly in England, can scarcely survive the severe winters of New York. In both the East and West Indies the mean temperature of the hottest month in the year differs very little (at Singapore 3½°) from that of the coldest. At Quebec, on the other hand, the difference is 60°, and at some places in Siberia, 100°. At Salt Lake City it is about 47°.

A summer mean of 73.4° may be thought high, but to the extremes of summer heat in nearly all parts of the United States the lower valleys of Utah offer no exception. The higher valleys and mountains are always at hand, however, and Great Salt Lake exercises a mollifying oceanic influence on the extremes of temperature. "Some travelers have imagined that on its shores is to be found the most unique and wonderful climate on the face of the globe, combining, as it does, the light pure air of the neighboring snow-capped mountains with that of the briny lake itself; and it is fancied by many that at certain points one may inhale an atmosphere salty and marine, like that of the shores of the Atlantic, happily combined with a cool fresh mountain air, like the breath of the Alps themselves. Owing to the absence of marine vegetation about the shores, however, there are none of the pleasant odors of the seashore."* At all events, the dry and absorbent character of the atmosphere relieves the oppression felt in humid climates at high temperatures.

HUMIDITY, RAINFALL.

The same may be said with reference to extremes of cold, although the average humidity in winter is more than twice as great as in summer. For the year it is 43; at Denver it is 46; at Philadelphia, 73. For spring, summer and fall, it is 37, while for summer it is 28.5. The rainfall averages 17.3 inches a year, 40 per cent. of which is in the spring, 9 in the summer, 25 in the fall, and 25 in the winter. In latitude 40° there should be, on general principles, 30 inches in a year. Fort Laramie, Sacramento, and Santa Fe have about the same as Salt Lake City; Denver, a little less; while over the entire area of the United States east of the 100th Meridian west from

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* Surgeon E. P. Vollum, U. S. A.

Greenwich, the average annual rainfall is 40 inches,[†] 60 per cent. of which is at once thrown off in the river drainage. Nothing in the meteorological register of the last seven years indicates that the climate of Utah is growing moister; but Rush Lake rolls its blue waves over what was a meadow 20 years ago, and Great Salt Lake has at least ten feet of brine where wagons were driven to and fro in 1863. It has not gained any in contents in the last decade, however, and it would be nowise surprising were it to recede again to its old level. If the rainfall has increased because of the greater area of land cultivated and quantity of water diffused by irrigation as well as of the currents tapped in opening mines, the lake may be expected to retain its present level. Increased humidity has followed the settlement and cultivation of the Mississippi Valley prairies, and it is not unlikely that it is doing so in Utah, although there is not sufficient data as yet upon which to assert it. A peculiarity of the climate is the preponderance of rainfall in the spring, when it is most needed. Could a part of the moisture that is precipitated in winter be transferred to the summer, there would be no necessity for irrigation. The days on which there is precipitation average one in four, but not half of them are really stormy days. There is hardly ever a cloud in the skies of Utah through which the sun is not looking.

RESUME.

The mean air-pressure at Salt Lake City is 25.63 inches; water boils at 204.3°. The prevailing winds are from the north-northwest, and the most windy months are March, July, August, and September. The mean velocity of the winds during the entire year is 5⅓ miles an hour. On the ocean it is 18; at Liverpool it is 13; at Toronto, 9; at Philadelphia, 11. The climate of Utah on the whole is not unlike that of northwestern Texas and New Mexico, and is agreeable except for a month or so in winter, and then the temperature seldom falls to zero or snow to a greater depth than a foot; and it soon melts away, although it sometimes affords a few days' sleighing. The spring opens in March, the atmosphere becomes clear as a dewdrop, deciduous trees burst into leafy bloom, and the green of the valleys pursues the retiring snow-line up the mountain slopes. The summer is pleasant in its onset, accompanied by fragrant airs and full streams. Springs of sweet water, fed largely from the surface, bubble forth everywhere. But as the season advances the heat increases, the winds become laden with dust, the storms are mainly dry, the springs fail or become brackish from concentration of their mineral salts, the streams run low, and vegetation parches unless artificially watered. Still, from the rapid radiation at the earth's surface, the nights are agreeably cool and give strength to bear the heat of the days. In October the air clears up again as in spring, and the landscape softens with the rich colors of the dying vegetation, which reaches up the mountain sides to their summits in places, but on them the gorgeous picture is soon overlaid by the first snows of approaching winter. The fall is delightful and generally lingers nearly to the end of the year.

SANITARY.

The dry air and slight rainfall peculiarly adapt Utah to that out-of-door living, tramping, and camping which so quickly renovates a broken-down nerve apparatus, and through that all organic processes. Pure water and wholesome food are abundant. One has a choice of altitude ranging between 4,300 and 10,000 feet above sea, access to a variety of mineral springs with remedial qualities for many ills, and in

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[†] Blodget.

Salt Lake Basin, containing 50 per cent. of the population, the ameliorating influences of 2,500 square miles of salt water. Hardly any form of disease originates or proceeds to the chronic stage in the Territory, and upon many who come here diseased, if not too far gone, mere residence has a very beneficial effect.

AGRICULTURAL.

There were surveyed of public land in Utah, down to the end of 1881, 9,749,995 acres, arable, timbered, coal, and mineral. Only that which can be artificially watered is really arable, although lands not subject to water are being more and more brought under cultivation, and in many places certain crops can be and are raised on such lands with no more than the ordinary chances of failure, elsewhere. But irrigation cannot be safely dispensed with as a rule. It is usually done by colonies or communities uniting to divert part or the whole of a stream from its natural channel on to the adjoining land, each member of the association then having his proportional right to the use of the water. While it involves outlay or labor on the start, it is not without its advantages. In other regions excess of rainfall often retards the putting in of crops in the spring, and damages hay and grain in the harvest season, by lodging, causing mildew, rust or sprouting, and with hay, leaching out its natural juices. Again, want of the ordinary rainfall often involves a widespread failure of all crops, causing extreme fluctuation in prices and inducing famines. In rainless countries the ill effects of these excesses of nature are avoided. The farmer can control seed time and harvest, and it is a striking fact that Egypt, Mexico, and Peru, all rainless, were the singular and sole birthplaces of civilization. Further, the soil is constantly enriched by materials, salts and earths, held in solution by the water, if it is kept on the land till absorbed. But few of the standard crops of Utah ever require more than two or three waterings to perfect them, some of them, especially fall wheat, seldom needing more than one. Most of the smaller streams that could easily be diverted from their natural channels, have been already utilized; but their full capacity as irrigating supplies, which can only be exhausted by means of dams, reservoirs, and canals of considerable importance, has not as yet been called into requisition.

AREA OF ARABLE LANDS.

As it is an interesting and important question, Major Powell, of the Geological Survey, approximately measured the volume of all the Utah streams, and found that, calculating the irrigating duty at 100 acres for each one cubic foot of water that could be delivered per second, there is enough to irrigate about 1,500,000 acres. But in 1875, according to returns collected and published by the Legislature of Utah, one-third of the ground cropped was not irrigated at all. The irrigating duty is, considering this, and also the fact that in Southern Europe and India it is 120 acres, average, per cubic foot per second, much too low. It should be put at 150 acres, and that would give 2,250,000 acres of tillable land. The capacity of these streams for irrigating can doubtless be largely increased by a system of reservoirs—a question of engineering. It has been found, too, that beside the storage of irrigating waters in reservoirs, and the enlarging of ditches so as to lessen the losses through absorption and evaporation, a great saving can be effected by early planting. By this crops will get a better start, and can be made, practically, while the water supply is most profuse. The soil should also be stirred six to twelve inches in depth, and in the fall. The ground will then become a storehouse of water during the winter and early spring, and slight irrigation will be sufficient. Cross ditches for the distribution of the water should be made more frequent. An important advantage would be gained by increasing the area of grass land, comparatively, since this can be watered and given a good start before the wheat and other crops need watering. Experiments have shown that wheat planted in drills 18 inches apart and cultivated, gives the best result. The yield is greater, the quality better, weeds are kept down, and irrigation rendered easy and saving. The soil should be stirred deeply for corn, and the seed planted in April. The crop should be cultivated three or four times, kept clean, and irrigated once slightly about the middle of June and once thoroughly a month later.

Finally, there are many springs, and a great deal of land that can and ultimately will be watered from wells; artesian, or windmill wells. Artesian well makers say that water can be found anywhere, the question being one of depth only. The French have sunk 75 to 100 wells in the Sahara, which yield 600,000 gallons an hour, sufficing for 25,000 acres of mixed crops. At Onarga, Illinois, 85 miles south of Chicago, within a circle of 40 miles in diameter, are 200 wells, averaging about 75 feet in depth, and yielding 2,225 gallons of water each per hour. In California there are a thousand artesian wells, most of them flowing. A few wells have been driven down to flowing water in Utah, and there are large areas in almost every county that might be made fruitful and valuable as any land in the world by this simple device. It might be good policy for the Legislature to encourage in some way the sinking of artesian wells.

It is not exaggerating to put the possible farming land of Utah at 3,000,000 acres. A certain 40 square miles of land in Valencia, Spain, under the canals of the Turia, sustains 70,960 souls. At the same rate, with the same strength of soil, the same tilth, sun, seasons, skill, and frugality, the arable land of Utah would sustain more than 8,000,000. So while the proportion of arable land seems small (6 per cent. of the whole,) there need be no fear of a scarcity.

HIGH CULTIVATION.

The necessity of irrigation keeps down the size of farms, and this induces high cultivation. The magnificent farming of Belgium on poor soil is due, (1,) to the perfection of both plow and spade work; (2,) to each field being shaped with the view to facilitate cultivation and drainage; (3,) to a most careful husbanding of fertilizers—M. De Laveley says "the Flemish farmer scrupulously collects every atom of sewage from the towns, he guards his manure like a treasure, puts a roof over it to prevent the rain and the sun from spoiling it, he gathers mud from rivers and canals and the excretions of animals along the highroads and the ways for conversion into phosphates"—; (4,) to the great variety of crops, especially of industrial plants, such as colza, flax, tobacco, hops, chicory, &c.; (5,) to second or stolen crops such as turnips and carrots, English clover, sparry, &c., whereby the cultivated area is in effect increased one-third; (6,) to abundance of food for cattle—although the soil is not favorable to meadows, yet taking the second crop into account, one-half of the available superfices is devoted to the keeping of live stock—; (7,) to house-feeding of cattle, by which the cows give both more milk and more manure; (8,) to minute weeding.

Divide Utah's 3,000,000 acres into 120,000 farms of 25 acres each; let them be farmed as above and with the view, being so far inland, of turning everything into stock; depending largely on lucerne, green crops, and ensilage, (the preservation of crops in a green state in pits for fodder)—the yearly out-turn would be marvellous, almost equal to the yearly revenues of the National Government. Ten acres of ensilaged maize will feed 140 cows and horses for seven months. The maize or other green crop is mown in flower, cut into half-inch pieces, placed in pits or silos, oval in form and of any desired capacity, with smooth bottom and walls, covered with planks fitting nicely and a great weight piled upon them, which causes the chopped fodder to settle together gradually but compactly and excludes the air. When wanted for use it is cut down as if it were hay and fed out; mixed with a little bran or cotton-seed meal, 60 pounds of it makes a daily ration for a milch cow. Twenty-five to seventy-five tons of maize can be produced on a single acre anywhere within the climatic area of Indian corn cultivation. This system, if it prove in fact half equal to what is claimed for it, will work intensely in the direction of small farms under high cultivation, without implying very hard or long hours of labor.

The Island of Jersey is about the size of one of our townships, yet it sustains 12,000 head of cattle, and annually exports 2,000 head. Land rents at $45 an acre and the whole island is a garden. Supposing there to be 130 townships of arable land in Utah, raising the Jersey cattle and as many of them on the same area, there would be more than 1,500,000 head, and 250,000 head annually sold off for export. The Territory yearly turns off perhaps $2,500,000 worth of beef and mutton on foot; of wool, wheat, potatoes, fruit, eggs, chickens, butter, &c.; but it yearly imports of corn, oats, canned goods, bacon, hams, lard, cheese, beans, crackers, starch, &c., nearly 10,000 tons. With plenty of soil that will yield 25 bushels of wheat, 10 tons of lucerne, and 250 bushels of potatoes to the acre, and no scarcity of water, all we use we should raise and what we sell should be profit.

There are 10,000 farms (9,264 in 1880) in Utah, averaging 25 acres each. Suppose their owners' energies to be turned mainly to the production of beef, mutton, and pork, and the products of the dairy: Ten acres in lucerne would give them 100 tons of hay, 5 acres in maize, put down in silos or pits as above, would give them 250 tons of food as good as growing clover, and they would have 10 acres left for garden, fruit, grain, roots, &c. On such a farm, with the outlying pasturage claimed and that can be claimed by nobody, 100 head of stock cattle, average value $20, or their equivalent, could be turned off, yearly, after a little. A hundred and twenty thousand such farms, $2,000 each = $240,000,000! Do not repeat that these mountain States can never be thickly peopled because there is so little arable land. There is enough, and the time will come when Utah, at least that part of it under the copious waters of the Wasatch Range, will be a garden, owned by nabobs. For really it can have no serious competition within 500 miles, east or west, all mining country, too, because the Sierra Madre and the Sierra Nevada shed their waters outward for the most part, and do not silt down so fine a soil.

PRODUCTS.

All the crops of the latitude are successfully grown in Utah. The following table is from the Census returns of 1880 (crop of 1879,) which was one-third below the average, owing to dry weather:

COUNTIES.	BARLEY.		INDIAN CORN.		OATS.		RYE.		WHEAT.	
	Acr's	Bush.	Acr's	Bush.	Acr's	Bush.	Acr's	Bush.	Acr's	Bush.
Beaver	387	6,482	84	517	223	4,331	......	....	1,610	18,270
Box Elder	939	17,097	780	9.024	737	15,088	578	3,218	5,306	75,200
Cache	176	4,442	624	9,228	1,358	29,343	190	2,285	10,258	208,553
Davis	2,691	38,660	891	11,443	550	18,454	65	668	7,453	92,347
Emery	26	126	17	195	69	762	......	....	237	2,496
Iron	291	7,438	494	9,193	353	6,761	......	....	1,366	19,386
Juab	319	5,141	89	708	155	3.234	......	....	927	11.324
Kane	74	1,686	639	7,621	39	1.136	......	....	632	11,933
Millard	1,097	17,375	11[illegible]	875	569	8,340	22	40	1,470	14,550
Morgan	8[illegible]	1,490	18	346	197	3,356	......	....	1,416	13,989
Piute	267	3,863	......	....	528	6,565	......	....	913	7,706
Rich	43	419	......	....	665	14,750	......	....	599	9.918
Salt Lake	683	16,395	1,213	23,398	836	22,073	112	1,056	5,385	106 632
San Juan	30	725	8	74	16	262	......	....	59	1.041
Sanpete	287	6,126	328	4,472	4,763	90.892	42	357	9,582	164,627
Sevier	160	3.426	126	1,447	2,8[illegible]6	52,245	......	....	4,598	70.528
Summit	106	2.285	......	....	903	22,171	......	....	1,976	36,329
Tooele	60	1,259	606	5,205	587	18,090	32	602	1,300	16.130
Uintah	......	....	41	883	......	....	......	....	67	1,780
Utah	1,774	47,561	2,933	41,310	2,215	50,264	45	520	7,326	125.685
Wasatch	......	....	5	70	485	16,144	......	....	1,62	29.174
Washington	198	3,467	157	1,636	29	537	......	....	473	6,672
Weber	1,580	31,677	2,844	35,700	1.442	33,284	67	859	7.969	124,929
Territory	11,268	217.140	12,007	163,342	19,525	418,082	1,153	9.605	72,542	1.169,199

Acreage in grain, 116,994; total yield, 1,976,152 bushels. The precipitation of the twelve months which made this crop, namely, October, 1878, to October, 1879, was 35.28 per cent. less than the average precipitation of the nine years, 1873-1881, including this dry year; and the crop was correspondingly less than the average, so intimately are precipitation of moisture and production connected. This may be thought to argue against what is claimed for irrigation, but even irrigation fails in very long continued dry weather. The fountains dry up because no snow falls, and the streams, the sources of irrigation, fail. Besides, nine years out of ten, even in Utah there is more or less, and more or less seasonable, rainfall. With no rainfall, it would be almost impossible to till a country and raise anything. The grain crop of Utah now is not less than 3,000,000 bushels per annum.

IMPROVED LAND, ETC.

Counting 100,000 acres in meadow, 23,000 in miscellaneous crops, and 10,000 in fruit, there are 250,000 acres under fence. Improved land, with water-right attached, is worth from $25 to $100 an acre, according to the locality. Ordinarily it is nearer the former than the latter figure. Although one-half of the arable land has been entered, nine-tenths of it is yet unimproved. Its settlement is better undertaken in colonies than individually. Irrigating channels, of which, big and little, there must now be 10,000 miles in Utah, can usually be made with plow and scraper, each adjoining land-owner contributing his quota, and having perpetual right, under Territorial and municipal law, to his proportional use of water at the additional cost for repairs. Under the desert land act, each person joining in such an enterprise is entitled to pre-empt 640 acres of land, paying one-fifth down and the rest in three years, on condition that the enterprise be consummated within that time. It appears from statistics, collected and published by order of the Legislative Assembly for 1875, that of the land in Utah then under plow and in hay, 33⅓ per cent required no irrigation; 16⅔ per cent. had one or two waterings; 60 per cent. needed three or four, and ten per cent. had from four to ten. This is the latest and indeed the only data obtainable on this point. It seems a large percentage needing no irrigation, but it may have been an exceptional season, and probably the most of it was natural meadow, more or less marshy.

TIMBER.

Utah holds an intermediate position, with respect to its supply of timber, between the Atlantic and Prairie States. Its arable lands are not interspersed with forests, nor yet is it without an adequate supply of timber within its own limits for building, fencing, mining, and fuel. The valleys or plains are destitute of forest growth, and in early times willow brush was resorted to for fencing, adobe bricks for building, and sage brush for fuel. But the mountains are generally more or less wooded, almost wholly with evergreens, however. The best trees furnish lumber not technically clear, but the knots are held so fast that they are no real detriment, and the lumber is practically clear. The red pine and black balsam indigenous to the mountains make a fence post or railroad tie that will last ten years. The white pine is not so good. More than half of the forest growth of the Wasatch is of the white or inferior variety. On the Oquirrh the trees are chiefly red pine. Scrub cedar and pinyon pine are quite common in the south and west. They are of little value for anything but posts, ties, and fuel. There are several saw-mills in operation in the Territory, and while the people are not enabled by law to acquire title to timbered lands, nor authorized to appropriate the timber on other than mineral lands, nor that save for domestic uses, they are permitted to use the timber subject only to the condition that they shall not waste it or cut the trees under a certain stated size. Ordinary rough building and fencing lumber ranges in price from $20 to $25 a thousand. Flooring and finishing lumber is imported, and costs about $45 a thousand. Wood is obtained from the canyons for fuel, and soft coal of good quality can be had for $5 to $10 a ton in all Northern Utah. When the coal deposits of the Territory shall have been developed and made accessible by railroads, the price should be less by one-third, for there is an abundant supply and it is widely distributed.

FRUIT.

The climate and soil of Salt Lake Basin are peculiarly well adapted to fruit-growing. The trees are vigorous growers and generous bearers; fruits, especially if half that sets be knocked off, large, fair, and fine-flavored; the crop remarkably sure. The higher valleys are of course comparatively less favorable to this industry. In the South, on the Rio Colorado, grapes do well, and wine-making is a growing business. The climate resembles that of Southern California, where cotton, tobacco, oranges, and semi-tropical products generally, are successfully cultivated. There is room for great improvement in the introduction of new varieties, too many of the trees, especially apples and peaches, being seedlings; and also in care, from a lack of which apples in some localities are growing yearly more infected with worms, and the trees with all kinds of noxious insects, minute red spiders, lice, &c. Formerly people pointed to their orchards as the fairest features of the landscape. Such a straight thrifty growth, the limbs and shoots seemingly swelled with wine or even blood for sap, and laden with the handsomest fruit, more than they could bear up, even with the aid of props. Now, from this invasion of worms and bugs, many, disgusted or discouraged, are digging up their orchards. Amongst the remedies suggested, the importation of certain birds, plentiful in the Western States, (cedar birds, indigo birds, orchard orioles, single black billed cuckoos, summer warblers) which subsist almost entirely on insects and worms, especially the latter, as has been demonstrated by experiment, would cost little and promises much. The Legislature might well provide the means and authorize some one to do it. Small fruits, all kinds of berries, grapes, currants, &c., do remarkably well in the valleys of Utah. The plants are easily propagated, grow thriftily and bear prolifically; while the fruits are large and of good flavor, and the crop hardly ever fails.

The following table shows the area, the product, and the yield per acre, of fruits, for the year 1875, as returned and published by order of the Legislature. [It is the only existing data on this point.]

Fruit.	Acres.	Total Yield.	Yield per Acre.
Apples	3,935	358,277 bushels.	90 bushels.
Pears	128	10,560 "	75 "
Peaches	2,687	330,535 "	120 "
Plums	259	43,585 "	165 "
Apricots	305	44,160 "	145 "
Cherries	62	4,661 "	75 "
Grapes	544	3,409,200 lbs.	6,260 lbs.

Total Acres, 7,920. Value, $1,028,616.

PASTURAGE, STOCK RAISING.

One great resource of Utah, and one easily discounted, so to speak, is the very extensive stock range. There is in such a country necessarily a great deal of land on the foot-hill slopes and river terraces which cannot be artificially watered, and yet is not cut off from water. The native grasses are probably not as good as the buffalo and gramma grasses of the plains east of the Rocky Mountains, but the bunch grass, which seems to be indigenous to the broken and elevated region between the Sierra Madre and the Sierra Nevada, is only second to them in excellence. Throughout this interior basin millions of acres are not absolute desert only because of the existence of this grass. It grows in bunches in apparently the most barren places. Early in the season it cures, standing, retaining all its nutriment, and being hard to cover with snow beyond the reach of stock. Its seed is pyriform, and has remarkable fattening properties. In the high, dry, bracing altitudes of the interior, cattle grow and fatten on much less than on the sea level, and the same degree of either heat or cold, as marked by the thermometer, appears to affect them less. The grazing lands of Utah are almost unlimited; including the second tables of the river courses, the slopes of the foot-hills and lesser ranges not too far from water, the shores of the sinks and lakes, and the coves and valleys of the mountains. In the Salt Lake Basin, generally, stock winter without fodder; further south, they not only subsist, but thrive on the range the year round. In Cache, Bear Lake, and other valleys more elevated, they require more food and shelter; and the stock-grower will do well to prepare for occasional cold and snowy spells in all the northern parts of the Territory. There is ample hay ground for this. Under ordinary circumstances, a five-year-old steer, worth $30, can be turned out for $5. Still, candor compels the confession that Utah is not a great stock country in the sense in which the term has come to be used in the West. Its native grasses have no turf to speak of, and if fed close are soon tramped out. They require nursing. The sense in which it is a fine stock country has been indicated under the heading of "High Cultivation," see ante. The yearly drive, outward, has come to be, according to the best estimates obtainable, 50,000 head of stock cattle, averaging $20 each in value.

The Census agents (1880) found in Utah 38,058 horses, 2,898 mules and asses, 3,956 working oxen, 32,765 milch cows, 58,680 other cattle, 233,121 sheep, swine not given; probably there are about 25,000. This is undoubtedly too low for the sheep. There can hardly be less than 400,000 sheep, shearing 2,000,000 pounds of wool. Of this about one-fourth is worked up by the Utah mills. Fleeces average 4 pounds for ewes, 6 for wethers. Part of it ranges with the best California wools, as to quality, while part of it is inferior. Utah and Montana wools are considered better than the wools of the other Territories. Most of the Utah sheep came from New Mexico down to 1870. Since then ewes have been brought in from California, generally fine-wooled Spanish Merinos, but little mixed; fine-wooled bucks from Ohio, and long-wooled from Canada. The same strain of blood in sheep does not produce quite so long a wool as in the East. It is so dry and dusty, the grease seems to absorb the alkali and mineral dust, which makes it harsher and more brittle. But since the large infusion of Merino blood, which has taken place in late years, there has been a marked improvement in the quality of Utah wool, in respect of length, softness, and fineness of fibre. It realizes to the grower, here, crude, about fifteen to twenty cents a pound, according to the range of prices abroad. The strain of blood in cattle, horses, and sheep, has been greatly improved in recent years, but it is still the point requiring attention. In Vermont the breeder with the best ram has the precedence. Inferior wool comes from shiftless careless breeding. An authority says, aim for the best mutton if you would get the best wool. This is the system in England, the great mutton-producing and combing-wool-producing country of the world. The characteristic qualities of the English combing wools have been developed upon originally short-wooled animals simply through a constant effort to improve their carcasses for the mutton market. From this it seems that the interests of the grower, the consumer of meat, and the manufacturer of wool, are identical. And they all depend upon the quality of the stock ram of the flock.

Castle Valley, near the corner post of Wasatch, Sanpete, and Utah counties, is a great sheep range, several large flocks being kept there. They are worth about $3.00 a head as they run, do not require feeding in winter, and if properly attended to, under ordinary circumstances, will yield a profit of 40 per cent. a year on the investment. They are beginning to be driven away in considerable flocks. Costing in May perhaps $3.00 including lambs, by the time they arrive in Montana or Colorado the lambs are worth as much as the sheep and the buyer has doubled his money a once. A more inviting field for capital and enterprise, for skill and care, than the production of beef, mutton, and wool in Utah, it would be hard to find, anywhere.

GOLD AND SILVER MINING

Began in Utah in 1870. The total output since is $60,000.000. The mining area is co-extensive with the mountains, of which the Territory is as full as Switzerland. Mines have been found and wrought in most of the counties. Many of the mining districts are now abandoned, but with better facilities of inter-communication and transportation, with more capital at command and more experience in reducing ores, they will be revisited and work resumed, not again to cease. The mining history of the Rocky Mountains and the Pacific Slope records nothing more striking than the sudden resurrection of dead mining camps. The records of the Salt Lake Land Office show 1304 applications for mine patents and 765 mineral entries. The productive districts at present are popularly known as the Park City, the Alta, American Fork, Stockton, Bingham, Tintic, Frisco, Marysvale, and the Silver Reef. The mines about Alta (Little and Big Cottonwoods,) at Bingham, and Stockton, all accessible from Salt Lake by rail and semi-circling the city within 30 miles, ship their ores to Sandy, the Swansea of Utah, and lose their individual output in that of the smelters which buy the ores—all but the Bingham gold mines which have gold mills. At Sandy, and on the Cottonwoods between there and Salt Lake, within plain sight of the city, are the Mingo, Germania, and Morgan smelters, the Germania refining lead also, whose united monthly product averages 800 to 1,000 tons of base bullion and lead, worth in Salt Lake about $190 a ton. The Horn Silver smelter is in the same vicinity and will be noticed later.

PRODUCT IN DETAIL.

Mr. J. E. Dooly, Salt Lake agent of Wells, Fargo & Co., gives the product of the Utah smelters, mills, and placers for 1881, as follows:

NAME.	LBS LEAD.	LBS. SILVER.	OZS. GOLD.	VALUE.
Horn Silver Mining Company	16,343,995	1,259,903	....	$1,807,092.20
Mingo Furnace Company,	11,977,649	437,175	832	801,315.58
Germania Smelting & Refining Co	6,882,657	349,179	508	635,759.30
Morgan Smelter	3,015,228	173,320	438	279,855.90
Frisco Mining & Smelting Company	2,023,213	221,846	425	330,229.38
All other Smelters	1,634,597	53,680	215	108,079.72
Ontario Silver Mining Company	....	1,909,870	....	2,119,955.70
Silver Reef Mills	....	614,368	....	681,948.48
Tintic Mining & Milling Company	....	73,031	406	89,184.42
Other Mills and Placers	....	43,804	4,613	140,882.44
In Ores Shipped East	2,895,023	276,141	530	390,092.16
Gross Totals	45,222,365	5,418,618	7,967	$7 384,526.28
Less worked over by Germania	385,365	18,427	39	30,868.09
Net Totals	44,837,000	5,400,191	7,958	$7,353,658.19

The deduction is base bullion purchased of other smelters and worked over by the Germania Refining Works. Of the lead credited to them, 2,645,373 lbs. is refined lead; all the rest is crude lead. The table includes product of Idaho, Nevada, and Montana ores, aggregating 3,969,440 lbs. lead, 441,846 ounces silver, and 976 ounces gold. Deducting this, the Salt Lake value of Utah's output for 1881 was:

Refined Lead, 2,645,373 lbs., at 5½c	$ 145,495.51
Crude Lead, 38,222,185 lbs. at 2½c	955,554.62
Fine Silver, 4,958,345 ounces, at $1.11	5,503,762.95
Fine Gold, 6,982 ounces, at $20	139,640.00
Total	$6,744,653.08

Against $4,975,967.27 for 1881, an increase of 35.54 per cent, The value of the product by furnaces and mills compares with last year as follows;

NAME.	1880	1881
Horn Silver	$875,810.10	$1,807,092.20
Mingo	475,224.75	801,346.58
Germania	422,980.62	685,759.30
Morgan	251,835.95	279,855.90
Frisco	in "all others."	330,329.38
All Others	472,628.97	108,079.72
Ontario	1,583,496.20	2,119,955.70
Silver Reef	930,668.20	681,948.48
Tintic Mining & Milling Company	47,275.20	89,184.42
Other Mills, Etc	116,737.80	140,882.44
In Ores	47,676.40	390,092.16
Gross Totals	5,224,234.29	7,384,526.28
Worked Over	96,331.47	30,868.09
Net Totals	5,127,999.82	7,353,658.19
Foreign Ores	152,032.55	609,005.11
Utah's Product	4,975,967.27	6,774,653.08

Rating these commodities at their market value in New York, say refined lead at 7, crude lead at 4, and silver at $1.14, would increase the total for 1881 to $8,128,-001.25. The output for the first half of 1882 was:

14,281 tons of Bullion, at $190 a ton	$2,732,390
Ontario mine, market value	1,254,129
Silver Reef mines	351,932
Stewart, Mammoth, Tintic Mining & Milling Company	100,000
92 tons Copper Matte, at $280 a ton	25,760
Total	4,464,211

At this rate of production, the output of 1882 will be $10,000,000, New York valuation.

UINTAH AND BLUE LEDGE MINING DISTRICTS.

These are adjacent districts, Park City being the town, and lie on tributaries of the Weber and Provo rivers, at a high altitude. One goes to Park City from Salt Lake via the Utah Central, Union Pacific, and Echo & Park City railways.

The great mine is the Ontario, owned by the Ontario Silver Mining Company, incorporated in San Francisco, capital, $15.000,000 in 150,000 shares. J. B. Haggin, of San Francisco, President; R. C. Chambers, of Salt Lake, Superintendent. It is the Ontario, Switzerland, Last Chance and West Ground, consolidated. It is a contact vein between quartzite and porphyry (Prof. Clayton holds, in quartzite), strikes east and west, dips 75° from the northern horizon, is opened to the 800-foot level, the pay-chute being so far as known 1550 feet long and on an average perhaps three feet thick; the 500-level is 1630 feet long, the 600 level 1625 feet, the 700 about 1000, the 800 maybe 400; it is equipped with a set of hoisting and pumping machinery at both the old and new shafts, and is sinking a third shaft supplied with enormous power and a Cornish pump with 22-inch column; it has a complete 40-stamp chloridizing mill with revolving dryers and Stetefeldt furnace, which is to be duplicated next year; it has three years' work for the present mill in sight in the lower opened levels, and has produced to the end of June last, $11,012,996.13, and paid to the same time, (June dividend paid July 15) 81 consecutive monthly dividends of 50 cents a share, 64 of them on 100,000 shares, 17 on 150,000 shares; total dividends, $4,-475,000. The mine turned out $1,014,996.96 before the company was organized, (included in above total.) In the hands of the company 118,188 tons of wet (93,800 tons of dry) ore has been taken out, the average product of which (market value) has been $106.60 per dry ton. Mining and hauling to mill has cost $13.90 per dry ton; reduction, $20.83 per dry ton. It makes water at the rate of 2,000 gallons a minute, which probably accounts for one-half the total cost of mining and reduction. Cost of pumping will be greatly reduced after the immense Cornish pump is in. It is the best in the lowest workings and the pay-chute grows longer with every level opened. A tunnel somewhat more than a mile long is being driven in to the 600-level to receive the water there and run it off. It is now in 1,000 feet. The new shaft is now 600 feet deep and will be first connected with the mine workings on the 900 level. The company practically own the Utah Eastern Railway running from the Weber coal beds to Park City, and delivering their coal at about $6 a ton. It is a wonderful mine, it has no equal on the globe, its productive period is only fairly begun. There is no reason, Prof. Newberry says, why it should not continue fertile to a depth of 3,000 feet or more, and the pay-chute bids fair to double in length.

Adjoining the Ontario on the east is the Parley's Park Silver Mining Company's property, the Parley's Park, Lady of the Lake, and Central, each 200 by 1,500 feet in area, incorporated in New York, capital $1,000,000 in 100,000 shares; President, Anthony Dey, of New York; Superintendent, Jno. G. Kennedy, of Salt Lake. A shaft has been sunk within 75 feet of the Ontario line, 735 feet deep. The levels in the mine are 300 feet higher than the same levels in the Ontario. The shaft passed through the vein, diagonally, above the 300 level, and drifts have been started toward the vein on three levels. The shaft and stations are ample and well-supported, there are 5 pumps and a double-acting hoisting engine. That they have the Ontario vein in this ground has already been demonstrated.

Further east is the Lowell location, 200 feet x 900, owned three-fourths by the Walker Bros. and one-fourth by J. M. Williamson, of Salt Lake. A shaft has been sunk 300 feet, the 200-foot level exploited by 600 feet of drifts, and the vein cut on the 300 level. Good ore is found, mixed with vein matter, along both walls. The walls appear to be approaching each other, and it is probable that the ore will make into a concentrated clean body, deeper. There is steam power for hoisting and plenty of pumps for the present amount of water.

The McHenry, Nos. 1 and 2, lies next eastward on the belt. It is owned by a Holland company, is opened to a depth of 400 feet, exploited by 1,500 feet of drifts and cross-cuts, makes ore in considerable bodies in places carrying 50 to 100 ozs. silver, no lead. It is regarded as sure to prove a great mine, properly opened up. The company owns a 20-stamp mill at Park City, cost $100,000.

There is beyond this the Hawkeye property, four locations consolidated, incorporated in St. Paul; capital $2,500,000 in 100,000 shares; President, Stanford Newel, of St. Paul; Superintendent, H. C. Willis, of Salt Lake. It has a first-class steam mining plant, shaft 300 feet deep, 200 level extensively exploited, vein of highly mineralized rock 50 feet wide, with high-grade ore, more or less clean and concentrated, on both walls. The opening of the 300-level has begun. The ground in all these mines is wet and the vein very wide, and it will take time and money to bring them to the producing stage.

Next east of the Hawkeye is the Boulder property, a group of locations covering 3,000 lineal feet on the fissure, consolidated. In the vicinity are the Free Silver claims, with prospecting tunnel in 400 feet; the Homestake, Little Giant, Wasatch, Glenco, and a great many others, all being opened as the means of their owners permit. All of them have turned out good ore, and apparently lack only development to make dividends. The Glenco has a heavy vein of smelting ore of good grade opened by an adit for several hundred feet. The Barrios property, adjoining the Ontario and Parley's Park on the north, is a consolidated incorporated group, considerably exploited and regarded as of great promise.

Westward of the Ontario, the first working company is the Empire, organized in New York; capital, $10,000,000 in 100,000 shares; President, G. L. Crowell, of New York; Manager, J. F. Crowell, of Salt Lake. The property is a consolidation of 13 locations of the ordinary size, making 60 to 70 acres. It is developed by a shaft 400 feet deep, with drifts to each 100-foot level, and drifts on each level for 400 or 500 feet. The vein is a strong well-defined fissure traversing a quartzite formation, varying in width from 4 to 20 feet. The ore on the 100 and 200 levels is a medium-grade free milling ore. On the 300 level a large body of high-grade ore was run through and this has recently been cut, stronger and richer than above, on the 400 level. The machinery is ample for the work, power, pumps, and tanks capable of handling 3,000 gallons a minute. The company has a 30-stamp mill on the ground and the grading for it partly done.

Two miles west of the Ontario is Pinyon Hill, stratified lime making an angle of 15 or 20 degrees with the northwestern horizon, containing one and possibly two bedded veins or strata of smelting ore, broken up by several faulting fissures cutting through them. This belt is really two to three miles wide and extends from Park City to the head of Big Cottonwood, five miles, taking in the Woodside and other mines in that vicinity, Pinyon Hill, with the Pinyon, Walker, Buckeye, Climax, Rebellion, Apex, and other groups of locations, and Scott Hill. It is perhaps the faulting by the fissures spoken of that enriches it on Pinyon Hill. There appears to be a mine there, if there are not two of them, 1,500 feet on the strike by 1,000 on the dip, from one to six feet and sometimes twenty feet thick, smelting ore, in the Walker and Buckeye about 30 lead and 30 silver; at Scott Hill about the same; in the Pinyon, Climax, and Rebellion, 40 lead and 40 silver on an average. In Scott Hill there are two beds at the least from six inches to four feet thick. All this ground is located; it is natural that there should be many conflicts of title, which there are; it is in fact a second Leadville, and is going through the inevitable litigation in such cases, which is holding it almost idle, so far as production is concerned.

Southwest of the Ontario the ground is also located for two or three miles, many supposing the Ontario contact fissure to curve in its trend so as to take that direction. The wash or debris is heavy, but the ledge is believed to come to the surface again in the White Pine, and Utah, from the character of the vein matter and ore and enclosing country. The White Pine has steam hoisting and pumping machinery, is opened by shaft and level to a depth of 400 feet, and is already a producing mine.

The Utah joins the White Pine westward, and is similar to it in all respects. It is owned by the Utah Silver Mining Company, it and the Bannister, Monta & Neddie and Midget locations. Edward P. Ferry, of Park City, is President of the company; Harvey J. Hollister, of Grand Rapids, Michigan, Treasurer; and David C. McLaughlin, of Park City, Secretary. The capital is $10,000,000 in 100,000 shares. They have fine steam hoisting works, have sunk a two-compartment shaft 350 feet, and will go 150 feet further before drifting for the vein.

It is thought that the Ontario fissure extends beyond this property to the head of Big Cottonwood. The Mohawk, Morning Star, McLaughlin, Farrish, Keystone, King Solomon, Great Western, Silver Bar, and Lakawaxen, are locations of promise along the supposed line of the fissure. The latter belongs to the New Bedford Silver Mining Company, Jno. S. Barnes, of Salt Lake, Superintendent. They are driving a tunnel to cut the vein 500 feet below the croppings. The vein is in granite, and bears fine ore. There is talk of a tunnel from Snake Creek to Bonanza Flat, four miles southwest of Park City, crossing and cutting at a depth of 3,000 feet the Mohawk, Utah, White Pine, and the entire group of which they are the center. South of the Utah, and a cross ledge, is the Jones Bonanza Nos. 1 and 2, which has steam hoist and pumps, and is opened to a depth of 400 feet by shaft and levels.

The Marsac Silver Mining & Milling Company built a 20-stamp chloridizing mill at Park City in 1874 at a cost of $100,000. For more than a year it was leased and run by the Ontario. In 1878, Mr. E. P. Ferry, of Grand Haven, Michigan, came out to manage for the company. He has overhauled and repaired the mill, which is now perfect in all its appointments—a dry crusher, twenty stamps, White & Howell sixty-inch roaster, ten pans, five settlers, a 20x48 Corliss engine. The company, through Mr. Ferry, as Trustee, own the site of Park City, and have realized largely from sales of lots. Their capital is $2,500,000 in 100,000 shares; President, Francis Smith, of Muskegon, Michigan; Superintendent and Secretary, E. P. Ferry, of Park City.

The Rebellion Mining Company was the first to disclose the great value of Pinyon Hill. After considerable work from hand to mouth, they struck ore early in 1881, and before they were stopped by injunction, shipped 1,200 tons of smelting ore, which brought in Salt Lake about $50 a ton. The officers of the company are: E. P. Ferry, President; W. S. McCornick, Treasurer; Jos. L. Heywood, Secretary. Capital, $30,000.000 in 200,000 shares.

The Park City Smelting Company is a Michigan organization; capital $200,000, of which Harvey J. Hollister, of Grand Rapids, is President; E. P. Perry, Manager, and C. H. Withey, Assistant Secretary. There is one seventy-ton stack in a fine building, well arranged to economise labor, and large enough for two more stacks, with convenient charcoal sheds and ore bins. Fluxing iron is brought from the Provo River. Limestone is abundant close at hand.

The ground east and west of the Ontario, for more than a mile in width and for five or six miles long, is all located. There are a score of companies not here named incorporated on groups of locations, mostly local, and only prosecuting work as the owners, generally miners, can earn and spare the means. It is a great district, well supplied with wood and water, accessible by rail, with the coal mines of the Weber but twenty-five miles distant, and two railroads to bring the coal. The mines (save on Pinyon Hill) are located on true fissure veins, of which there are several systems, and give promise of great regularity and permanence. With money and time the district will no doubt contain many productive mines beside the Ontario, which justly stands at the head of all silver mines at present wrought in the world.

ALTA.

This is the town of the Little and Big Cottonwood mines. It has communication by railway and tram with the Sandy smelters in Jordan Valley. The mines here lie largely on the divide between the two Cottonwoods, and so no distinction will be made between the mines of the two districts. The ore occurs in chambers in limestone, and in pipes and chimneys in what appear to be fissure veins or ore channels, and was originally mainly galena, but is now carbonate of lead. There are many famous mines, and hundreds of more or less promising prospects.

Among these the Emma perhaps ranks first, although the Flagstaff has exceeded the Emma in point of product. The surface bonanza of the Emma contained 30,000 tons of $100 ore, but the property has long been under a cloud. It is now re-organized, all its troubles settled, and work again begun. It has ample ground and a settled title. A prospecting shaft is being sunk from the end of the Bay City Tunnel, about 1,000 feet below the surface, and 250 feet in the hanging country, which is expected to crosscut the vein or ore channel at a depth of 400 to 600 feet. The power is at the mouth of the tunnel and is steam.

The Joab Lawrence Company is a consolidation of the North Star and Vallejo Tunnel and ground. It is worked through the Burgess Tunnel, and has produced 10,000 tons of $75 ore, has a great amount technically in sight, and is a steady shipper. It is opened to a depth of 800 feet, and has a mile of winzes and galleries. The ore channel is in hard stratified lime, is 150 feet wide, and is crossed from wall to wall almost at a right angle by regular ore chutes, separated by brecciated vein matter, there being seven of them in 250 lineal feet of the vein. It is a fine smelting ore and is run down the hill on a tramway. It is owned by Joab Lawrence and Charles Read, of Salt Lake, and is regarded as a very valuable property.

The Flagstaff is a consolidation of the Flagstaff, South Star & Titus, and Virginia locations, incorporated in London. More than 100,000 tons of $30 ore have come out of the mine. The ore-chute varies in length from a few feet to 300 feet, and in diameter from the size of a well to that of the ring in Robinson's circus. Prof. M. C. Vincent, of London, is the President of the company; Edward Austin, of London Bank of Utah, Manager, and M. Gunderson Mine Captain. The workings are of course deep and extensive. The ore in the deepest workings is the best on the whole ever produced by the mine.

The City Rock is a consolidation of a group of mines. The Utah, West Wind, Black Bess, and Oregon are on the same vein; it is a true fissure in crystalline lime, opened on the strike by adit levels a length of 4,000 feet. It saddles the divide between the Cottonwoods, strikes nearly east and west, at right angles with the bedding of the limestone, and dips from the northern horizon about 75°. The vein averages three feet in width, and is a series of ore chutes or chimneys separated by vein matter more or less mineralized or mixed with ore. The City Rock is worked by upraises from an adit 2,000 feet long and somewhat less than a thousand feet below the crest of the divide. It yields a fine smelting ore, worth an average of $50 a ton. Enough was taken out in driving the lower adit to pay the cost of the work. It is a good property and in fine condition, a regular shipper of ore; it is mainly owned by R. C. Chambers, and is managed by L. U. Colbath, both of Salt Lake.

The Eclipse, incorporated in New York and managed by Moses Hirschman, of Salt Lake, is developed by extensive workings to a depth of 700 feet, has steam hoisting works, has been for years a steady producer and shipper, and shows no signs of exhaustion.

The Antelope & Prince of Wales belongs to the Walker Bros., of Salt Lake, has produced a round million, is exploited a length of 2,000 and a depth of 1,100 feet, appears to be a true fissure in lime, and is as it long has been a steady shipper of ore. The Reed & Benson is owned by Eastern men, managed by Fred. C. Reed of Salt Lake, and bears rich ore. It is high up on the crest of the Range, and at a depth of 500 feet the working of the mine from the top was stopped, and a tunnel begun to strike the vein a thousand feet from the croppings; this is now in 1,800 feet and being driven ahead. The Richmond & Teresa, the Nabob, the Carbonate, the Toledo, Highland Chief, the Lavinia & Grizzly, the Island & Davenport, are all noted mines, have produced largely, are extensively exploited, and have more or less mining plant, some of them good buildings and steam hoist and pumps.

Of mines about Alta which have not reached the stage of large production may be named the Gardner & Morrill, McKay & Revolution, Centennial, Butte, Oregon, Ravine, the Whippy group, Wasatch & Humming Bird, the Fritz group, Geneva & Oxford, Sedan, Kate Hayes, Skipper, Jones & Paddock, Alpha, Peruvian, Moltke, Kenosha, Rocky Point, Albion, Maybird, Lexington, Gunderson, Rough & Ready, and many others. Most of them are to be cut at great depth by the numerous tunnels being driven into the hills. These are steep and bare and the snow slides, so that by tunnel is the only way to open and work the mines. Many of these mining tunnels have already attained a goodly depth. Amongst them is the Snow Storm Tunnel, owned, together with a group of eleven locations, lying south and west of the City Rock group, by the Gardner & Morrill Mining Company, O. L. Gardner, of New York, President, and J. C. Morrill, of Alta, Superintendent. The tunnel is designed to open and prospect the veins, which bear all kinds of ore, copper, lead, silver, gold, and give some extraordinary assays. They have made 1,200 feet of excavations, tunnel, drifts, and winzes, at a cost, including plant, of but $7.82 a foot. Evidently they have adopted the right principle—care and economy, too often lost sight of in gold and silver mining.

On the Big Cottonwood, in its lower course, are the Maxfield, Oskaloosa, Fairview, Dolly Varden, Norton, Thor, Bright Point, Montreal, Jupiter, Telescope, Crœsus, Excelsior, Carrie, Queen Bess, McHawk, Gen. Garfield, Little Fred, Legget, Resolute, Topaz, Silver Mountain, Unknown, Boulder, Alta, Kate, Lone Pine, Relief, and a great many more. The Maxfield is a regular fissure vein producing 70-ounce ore, now owned by an Eastern company which intends to open and work it. Most of these mines perhaps are incorporated. There are the Jupiter, the Old Evergreen, Silver Mountain, Albion, Imperial, Madelon Consolidated, and other companies, mainly local and lacking the means to do much. There is a continuous belt of mineral from the heads of the Cottonwoods, which flow west, through Scott Hill and Pinyon Hill and Bonanza Flat to the Ontario and beyond, including the heads of American Fork covering probably 100 square miles, and in which 618 mining patents have been applied for. All in all there is no more productive mineral ground known and none more accessible or favorably situated and endowed.

AMERICAN FORK DISTRICT

in Utah county, at the head of American Fork River, and is reached in 30 miles over a good canyon road from American Fork town, on the Utah Central, south of Salt Lake. The Silver Bell is the most prominent mine at present. It is a strong vein of milling silver ore, opened on the strike about 300 feet and to a depth of 400 showing ore everywhere. An adit level is being driven in on the vein a distance of 2,500 feet, where it will intersect the working shaft a thousand feet below the croppings. Between 400 and 500 feet in this adit enters good ore. There is a group of locations which go with the Silver Bell, and altogether it promises to become a great property.

In the vicinity are the Amaryllis, and the Non-Compromise, owned by the Comstock Mining Company; the Russler, the Germania, and the Excelsior, belonging to the Utah Consolidated Mining Company; the property of the Miller Mining Company, which has produced nearly a million; the Pittsburg property, an immense deposit or vein of low-grade (in silver) lead ore; the Sunday, Hidden Treasure, Mary Ellen, Live Yankee, West Extension, Bellerophon, etc. Lower down the hill and stream are the Wild Dutchman, Mono, Fairview, Caribou, Washington, First Chance, Orphan, Lost Maid, Annie, and many others. Some of these properties have a great deal of work done on them, and have paid well for it; many of them are producing steadily, in a larger or smaller way.

Silver Lake District is generally merged in American Fork District. in common speech. It is on Deer Creek, and contains the mines of the Deer Creek Mining Company—the Beethoven, Happy Boy, Gov. Murray, Bertie, and Hope. The first two have been considerably developed and promise well. The Milkmaid is a fine prospect, or something more. The Helen Mar, in the highest sawteeth of the Range, shows a large body of low-grade (in silver) ore. There are beside the following locations, of which much is expected by their owners: Wasatch King, Kelsey, Hope, McCall, the Austin, and some others. The district is much like Little Cottonwood District, which joins it on the north, save that the ore-bearing lime seems to have been more eroded and carried away. On the sides and at the feet of the upper high steep hills, a great deal of very rich ore in both lead and silver has been found as float, supposed to be part of the debris too heavy to be swept away by the denuding agencies.

BINGHAM CANYON.

This is West Mountain Mining District, West Mountain being the Oquirrh Range facing the Wasatch across Jordan Valley. Bingham Canyon opens a way into the mines, which is occupied by a railroad. The country is quartzite, broken up by massive dykes of eruptive rock. The mineral belt is broad and contains many fissure veins, sometimes crossing and sometimes conforming to the bedding of the country rock. They are of large dimensions, but on the whole continuous, and probably permanent, promising a long mining life to the district. The ore is partly galena, partly iron, largely silicious, both decomposed on and near the surface, forming carbonate in one case, and brown hematite, very quartzy, in the other. The silver-lead ores have long been worked; the gold ores have hardly been worked at all.

Amongst the famous silver-lead mines, which have turned out from 50,000 to 125,000 tons of ore each, worth $20 to $30 a ton, are the Old Telegraph, Spanish, Jordan, Neptune, and Revere. The Lead, Yosemite, and First West Extension of the Telegraph are similar mines which came to their productive stage later. They are all on the great lead belt which is nearly two miles long, and comprises beside those named, the Telegraph, Miner's Dream, Portland, Wasatch, Hamlin, Victor, Grecian Bend, Rough & Ready, Utah, etc. The Lead appears to be below the bed of pyrites upon which some of the others have temporarily grounded, at the surface. The ore body is of irregular dimensions, but in general 128 by 180 feet, the strike being diagonal with the location. It is equipped with steam hoist, and owns a concentrating mill in Butterfield Canyon, with tramway to the mine. The shaft is 500 feet deep, and a winze goes 80 feet deeper. There is a vast amount of ore in sight (362,000 tons), one-sixth of which carries 50 per cent lead and 5 to 10 ounces silver; the rest will by concentration go one ton in three 60 per cent. lead and 5 to 10 ounces silver. The ore chimney shows no signs of bottoming and makes no water. The First West Extension of the Telegraph is equipped with steam hoist, and opened by shaft to a depth of 525 feet. A tunnel intersects the shaft 75 feet below the croppings, and from this a level has been run either way 100 and 600 feet respectively, cutting three ore chimneys and exposing 10,000 tons of ore, a soft carbonate, very desirable for smelting, 50 to 60 per cent. lead and 5 to 30 ounces silver, and a little gold. It is shipping to Sandy 500 tons of first-class ore per month, and piling on the dump nearly as much more of a lower grade for concentration, It has paid for plant and development with the 8,000 tons of ore taken out, and is now paying handsome dividends. The works are in a gulch, the ground rising each way, making the 75-foot level really 200 feet below the general surface of the mine. The Yosemite has a good mining plant, including steam power for hoisting, has been long worked, and still shows no signs of exhaustion, but it is generally worked out as fast as it is exploited. It has, like the Jordan, Utah, and others of the low-grade mines, great quantities of the so-called gold ores.

The Winnamuck, Tiewaukie, Dial, Aladdin, Live Yankee, Live Pine, Hooper, Last Chance, Alameda, Giant Chief, Cabin Home, Clipper, Bret Harte, Ida Elmore, Sacred, Hidden Treasure, Ashland, Northern Light, Rob Roy, Frisco, May Queen, Highland Chief, Keepapitchinin, etc., bear silver-lead ore in varying quantity, but generally of a much higher grade than those named as being on the great lead belt. The Ten-Forty, Greeley, Morning Star, Ashton, Centennial & Moscow, Eberhardt, Saturn, Crœsus, Yampa, Amelia, and Arrowpeen may be said to grade in the quality of their ores between the two classes first mentioned. Some of them are thin and uncertain veins, others have been extensively if not always judiciously exploited, and have given up a good deal of marketable ore.

The Tiewaukie, 800 feet below the croppings, has a very strong vein of exceedingly rich ore. It is a consolidation of thirteen locations, and is incorporated in Salt Lake. Located on the bluff side of the canyon, it requires no hoisting or pumping works, but will when worked below the bottom of the canyon. It ships easily $10,000 to $15,000 worth of ore to Sandy per month. The Winnamuck, having exhausted its ore chimneys down to the level of the canyon stream, seems to be paralyzed. The Last Chance has been worked to a depth of 1,000 feet. It belongs to an English company as the Winnamuck does to a Holland company, and the old Telegraph to a French company. One might think that these foreign companies, with their command of capital, experience, and skill, and reputed economical management, would achieve better results than our people, but for some reason they do not. The Mayflower produces a milling silver ore. It is a thin but true fissure, and opened to a depth of 500 or 600 feet. The ore is about the medium for Bingham grade. The Queen and the Lucky Boy, in Black Jack Canyon, also produce a true milling ore of high grade. They are both being extensively exploited and to great depths, and show considerable bodies of ore in the various workings.

Of the iron or gold ores Prof. Newberry says:

"The ore in the Yosemite, Jordan, Utah, Red Rover, Spanish, Stewart, etc., varies from twenty-five to fifty feet in thickness, and as the strata are deeply cut by the ravines, the outcrops are sometimes 400 feet above the drainage and water levels. All this part of the veins is oxidized, and the ore is free milling, yielding on an average about $10 to the ton in gold. The quantity of ore of this kind in these great and continuous veins is enormous, and sufficient to form the basis of a successful mining industry for years. The ore is very soft, is mined with great facility, and with proper appliances could be as cheaply crushed as any ore in the country. In many locations the mines can be worked by open cut. Here no timbering will be necessary, and the cost of mining and milling should not exceed $2 per ton. A profit of more than $5 to the ton may easily be secured, and thus the gold production of Bingham may become as great and profitable as that of the Black Hills."

There are a score of these mines beside those mentioned by Newberry, most of them consolidations of groups. The Old Jordan Company takes in the Jordan, which is a mile long, the American Flag, and Excelsior. It has a 60-stamp mill on the Jordan River, a million tons of ore in sight, and a 10-stamp mill on the ground with which it is experimenting. The principal owner is L. E. Holden, of Cleveland, Ohio. The Stewart is incorporated in Salt Lake, and belongs to Gilmer, Salisbury & Co. It has as much ore in sight as the Jordan, and so has the Utah, belonging to Thos. R. Jones, of Salt Lake, and several others of these mines. The Stewart No. 2 was incorporated in Salt Lake as the Bevan Company; it has a surface area of 600x1,500 feet, is extensively opened, has a 10-stamp mill on Carr Fork, and has recently passed into the hands of an Eastern organization. The Essex, the Hopewell, the Summit, the Phœnix, and the Mineral Point companies are Salt Lake organizations, owning several locations each. All the ground on Carr Fork and its tributaries, on both sides to the top of the enclosing hills, and for a mile or two up and down, is located, and it is a gold Leadville. It would be idle to attempt to name the mines or describe their workings. The whole country is a bed of gold-bearing, quartzy, decomposed iron ore. If it could be quarried out on a great scale, and run through mammoth mills (and it can be) it would yield as large a profit as the Black Hills ores, which pay handsome monthly dividends year after year. Amongst locations in this section which promise to be of importance are the Omaha, Bonham, Highland Boy, Henry M., Sunrise, Sunset, Northern Chief, Nellie, Rodout, Frisco, Hampton, Benton, Miners' Home, and Wide West No. 2. There are many more, perhaps, but this chronicle cannot even list them, nor the hundreds of mere prospects. The Bingham mines are most eligibly situated. The miner has a sure and quick market at Sandy, sixteen miles distant by rail. It is estimated that the district has sent out 500,000 tons of ore in the last ten years, making 100,000 tons of bullion carrying $8,800,000 in silver, $1,500,000 in gold, and $5,000.000 in lead = $15,300,000. The carbonates of the surface bonanzas have been largely worked out. There remain enormous quantities of base ores, in a matrix of quartz and clay, untouched.

STOCKTON.

One goes to the Stockton mines from Salt Lake *via* the Utah & Nevada Railroad, rounding the Oquirrh Range on the lake shore. They lie on its western slope, about forty miles west of Salt Lake City, near Rush Lake. The country is quartzite and lime, with underlying syenite. Granitic porphyry dykes disturb and cross the veins, which trend mainly with the formation. The gangue is oxide of iron, quartz, spath, and clay. The ore is silver-lead, mostly carbonate, free from bases, worth $20 to $30 a ton in the Salt Lake market. Formerly there were smelters on Rush Lake, but it is more profitable to ship the ores to Sandy and sell them than to reduce them on the ground. So the smelters are dismantled, or shut up.

Of the producing mines the Great Basin ranks first. It is opened on the strike about 400 feet, and to a depth on the incline of 940, the vein varying from a few inches to six feet in width. The mine has steam hoisting works and a concentrating mill. It is incorporated in Boston. Gen. P. Edward Connor is manager. Contiguous to the Great Basin is the Quandary, also incorporated in Boston. It has steam hoisting works, but since the surface bonanza was exhausted no paying bodies of ore have been found in it. West of the Great Basin is the First National, incorporated in Cleveland, Ohio, which has steam hoist and is extensively exploited; and near by is the Silver King, a strong vein, out of which a good deal of ore has been taken—owned by General Connor. The Leonore, owned mainly by Col. Shaughnessy, is a large shipper of ore, and so is the Calumet. Amongst other prominent mines are the Maybelle, Merwin, Wade Hampton, Josephine, No You Don't, Central, Elizabeth, Victoria, Montana, Black Eagle, Lion No. 2, etc., on some of which considerable work has been done and much ore extracted.

Dry Canyon and Ophir Districts, lying southeast of Stockton, opposite the Bingham mines, are almost abandoned at present, but it needs no prophet to foresee a bright day in the future for them. The Hidden Treasure, worked to a depth of 1,600 feet on the incline, the Mono, Queen of the Hills, and Kearsarge are Dry Canyon mines, which have produced together two to three millions. At Ophir there are the Miners' Delight, Mountain Lion, Zella, and other noted mines, the surface bonanzas of which have been exhausted, and work struck for want of means or disposition to go deeper or wider in exploitation. One day, new conditions, greater knowledge, accident, or luck, or pluck will break this spell of idleness, and the cheering note of a prosperous mining industry will again enliven Ophir and Dry Canyon. The whole country, including the Mexicos, has now been pretty well run over, and it is the opinion of the most experienced mining men that the next rush will be for abandoned mines and districts, with no good cause for abandonment save the hope of doing better over the mountains and far away. Beyond these districts on the Oquirrh is Camp Floyd District. The Carrie Steele, with a 20-stamp mill, is the principal mine. It bears very rich ores but is pockety and uncertain, and has not been very successfully wrought.

TINTIC.

Southward of Camp Floyd, in Juab county, 80 to 90 miles from Salt Lake, still on the western slope of the Oquirrh, the range being much lower and less massive than at Bingham and Ophir, lies the Tintic Mining District, reached via the Utah Centra and the Salt Lake & Western railroads. About two-thirds of the ores carry gold, silver and copper; the rest are lead-silver ores. The most important mines are the Crismon Mammoth, owned by the Mammoth Mining Company, a local incorporation; the Eureka Hill, belonging to a company of the same name, also local; the Northern Spy, the Beck, and the Carisa. The Crismon Mammoth is a 40-foot vein apparently breaking across the stratification, opened on the strike 500 feet and to about the same depth. The main chimney is nearly a hundred feet in diameter, mainly clean ore, averaging 6 to 10 per cent. copper and $30 to $40 gold and silver. A great quantity has been taken out, the mine having been a heavy producer for seven or eight years, but there must be more ore and better ore than ever down below. Deep enough it is likely to prove to be in the contact between the lime and granite, which are perhaps a mile apart on the surface. The 27-stamp mill of the company, which is ill-adapted to treat the ore, is to be dismantled, and matting furnaces having a daily capacity of 200 tons erected. Four, capacity daily, eight tons of ore each, are in operation, and six more are being built. Five tons of ore are run into one ton of matte, making a 50 per cent. matte, at a cost of $12 a ton of ore. The product is worth an average of $200 a ton in Salt Lake. The process is a metallurgical success, and it is believed the local conditions are such as admit of its being made a success, economically. Mr. W. H. H. Bowers, of Salt Lake, is the introducer of matting, and if it succeeds he will become the owner of this noble property.

The Tintic Milling & Mining Company has a complete 10-stamp chloridizing mill at Homansville. They own no mines, but different members of the company own the Northern Spy, the Elmer Ray, and the Park mines, and an interest in the Golden Treasure. The first supplies the mill with a majority of the ores reduced, bearing silver and gold, an average of $65 a ton. The Park ore is galena rich in both lead and silver. The Elmer Ray has some milling ores, but its present output is mainly pyrites and is used in the matting furnaces. The Golden Treasure ores are free milling and of good grade. Mining costs about $8 a ton; milling $16 to $24 according to the character of the ore. The mill does first-class work. It has room for ten additional stamps, and is capitalized at $50,000 in 500 shares. Joseph A. Sleeper is President; Alexander Graham, Superintendent.

The Eureka Hill mine is in lime; it produces all kinds of ores; the workings are extensive; it has turned out a great deal of money, as high as $33,000 in a month. It has steam hoisting works but no mill. The ores are shipped and sold, usually in the Salt Lake market. Sometimes they are exceedingly rich, but their average market value is $30 to $40 a ton. John Q. Packard is president of the company and manager of the business. There are 10,000 shares and they occasionally earn dividends. The Beck & Bullion are new locations adjoining the Eureka Hill property, the mines and ores being of the same general character. They have sent to market $100,000 worth of high-grade ore within a year. The latter is being judiciously opened and the ore taken out in sinking and drifting more than pays the cost of the work.

The Sunbeam is one of the noted mines of Tintic. There are nine separate locations on the ledge. The Sunbeam has steam hoist. There are a score of shafts and miles of galleries and winzes. Thousands of tons of ore have been extracted. The deepest shaft is 350 feet. Several are 200. The Tisora, Julian Lane, Bismuth, and Golden Treasure are on the Tisora ledge, and are all extensively exploited. The ores of all these mines, selected, carry 80 to 100 ounces silver to the ton beside gold and copper and often lead. They are milling rather than smelting, but probably matting in preference to either. The Mammoth Copperopolis is on the same line of fissure as the Crismon Mammoth and has many of the same characteristics. It belongs to an English company, has long been idle, but with matting for its copper-silver-gold ores and railroad transportation, it is not likely to be so any longer. Amongst the mines which can only be named are the Bonanza, Swansea, Lucky, Undine, Governor, June Rose, Martha Washington No. 2, Black Dragon, Diamond, North Star, Hungarian, Cricket, Joe Bowers, Rising Sun, Morning Glory, King James, Silver Spur, Arizona, Brooklyn, Chloride, Red Rose, Rustler, Humpty Dumpty, Shower, &c., all of which have produced ore in greater or less quantity and generally of good quality. Above Silver City, the principal one of the four mining towns strung along the mineral belt for twenty miles (Eureka, Diamond, and Homansville being the other three.) there is an immense outcrop of iron ore carrying a little gold and silver, from which it is quarried out and taken to the various lead smelters to flux silicious ores—20,000 tons a year of it. It is the opinion of good judges that Tintic District has more paying mines and mines that a little money and perseverance would bring to the paying point, than any other in the Territory. Certainly in no district are prices comparatively so moderate. It is a fine place to mine, not high, not wet, mild winters, no snow-slides. The only drawback is scarcity of water, and this would be obviated were two or three mines (Joe Bowers and Tisora) to be worked, and the water made pumped out of them. It is a very inviting district for capital, skill, and enterprise, and it is nothing against it that many of the mines formerly productive are now idle, since the agricultural settler in a new country has nothing to contend with compared with what a poor man has to in opening, providing plant, and getting even a good mine to the dividend-paying stage. About 520 applications for mine patents have been made in these West Mountain or Oquirrh districts.

BEAVER COUNTY

Contains five mineral-bearing ranges, striking north and south, to wit: the Wasatch, Granite, Star, San Francisco, and Wah Wah. The first forms the boundary line between Beaver and Piute counties. On the eastern slope, on tributaries of the Sevier River, are the mines of Ohio and Mt. Baldy Districts (Marysvale), which will be noticed later. On the western slope mines have been discovered, but not much has been done, the timber being thick and no roads of consequence.

Granite Range lies between Milford and Beaver, is seven miles wide by thirty long, fairly timbered and watered, easy of access on all sides, and is covered with mining districts: Antelope, McGarry, Granite, Bradshaw, and Lincoln. The mountain is more lime than granite. The ores are largely iron, carrying, however, lead, silver, and gold. Bradshaw District contains the Cave mine, which will be noticed below. Lincoln District boasts the first-discovered mine in Utah—the Rollins—a very heavy deposit of argentiferous galena, owned at Salt Lake. Here also are the December, the Creosote, Coral Reef & Richmond, Lone Brother Nos. 1 and 2, Keystone, Clutcher, and others, generally locally owned and worked as the means and opportunities of poor men allow. Several of the mines produce ores carrying a considerable percentage of bismuth, notably the Bismuth mine and the Lone Brother Nos. 1 and 2.

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STAR DISTRICT

Lies about Shauntie Springs, on the south end of the Star Range, a few miles west of Milford. It formerly kept two or three smelters running, and has turned out a round million. Exhaustion of the surface bonanzas, distance from railroads, and the fall in lead, caused the temporary abandonment of smelting, but development in many of the mines has gone on, and they make a fine showing. It is claimed that the district contains 40,000 feet of shafts, tunnels, drifts, etc., in blasting ground. Amongst the leading mines are the Mammoth, opened by tunnel 600 feet long, intersecting a shaft 400 feet deep; the Hoosier Boy, shaft 220 feet deep, has turned out $120,000; the St. Mary's, extensively exploited and showing 3,000 tons of ore in the workings and on the dump; the Harrisburg group, of which the Kannarrah is the principal after the Wasco—the latter with shaft 900 feet deep, worked by windlass, and both of them paying their own way.

In West Camp of this district is the Talisman, with 4,000 feet of workings, exposing a good deal of ore; the Wild Bill, Flora, Ivanhoe, Empire, Zulu, Crœsus, Dikes & Morehouse, Rebel, Hickory, Hidden Treasure, Summit, Elephant, Golden Era, Vicksburg, Newburg, Wyoming, Pleiades, Tribune, Valley, Vulcan, Cortez & Esmeralda, the latter a strong and continuous vein of free gold rock with true quartz gangue. The Tribune and Valley mines are fissures, shaft 135 feet deep, ore assaying $30 gold and $40 silver. Near Shauntie Springs, in Pig Tail Canyon, are the Burning Moscow, a mountain of low-grade lead, standing over against a mountain of silver-bearing fluxing iron, honey-combed by drifts and tunnels; the Boston, Baltimore, Mazeppa, St. Peter's, etc. The shipments to the Shauntie and other smelters from this district for eight years averaged 45 per cent. lead, 40 ounces silver, and $5 to $10 gold.

ROCKY AND BEAVER LAKE DISTRICTS.

These occupy the broken north end of the Star Range and country adjoining, and are full of ores carrying iron, copper, gold, and silver in combination, copper predominating. The Old Hickory and the O. K. are the prominent mines. They are very heavy ledges, but the ores are easily separated from the vein matter. Closely selected, they bear shipment to the seaside for reduction. Thus Milford is all but ringed about with mining districts and mines needing only capital and work to make them dividend-payers. Beside those named, the Old Red Warrior, Burlington, Bellflower, Florence, Lake Superior, Bunker Hill, True Fissure, Big Bonanza, Creedmoor, &c., make a good showing. The owners as a rule are miners who can just about earn enough money to keep up assessment work. Capital and well-directed energy would in a short time make Milford the center of as prosperous a mining section as there is anywhere. There is but little water in Beaver River at this point, but plenty can be had by sinking wells twenty feet. The whole valley, hundreds of square miles, might be made a garden by wells and windmills, and Granite and Star ranges which border it the scene of great and successful mining activity. There should be lead and copper smelters on the ground pouring out a steady stream of lead and copper riches, and there might be as well as not. There is no place in Utah where capital can be used to better advantage.

SAN FRANCISCO DISTRICT

Covers the San Francisco Range; it is west of the Star Range, and about 15 miles west of Milford. Frisco is the mining town and is 243 miles south of Salt Lake City, via the Utah Central Railway. The terminus of the main line is at Milford, Frisco being on a spur and 1,500 feet higher than Milford. The most prominent mine is the Horn Silver, owned by the Horn Silver Mining Company incorporated in New York; capital, $10,000,000 in 400,000 shares; Charles G. Francklyn, of New York, President; Harry C. Hill, of Salt Lake, Manager. The mine is a contact vein between dolomite and trachyte. The outcrop resembled the top of a haycock and was found by accident. It is 50 feet thick, clean ore, and is opened by levels at suitable intervals nearly 500 feet on the strike down to the 500-foot level. It is dry in the deepest workings, yet about a mile away and at the same altitude, an artesian well 250 feet deep supplies the smelter with water. The ore is decomposed argentiferous galena worth about $50 a ton, of which it has cost perhaps ¾ to get it into money, but this includes cost of plant. The mining and smelting plant is now very complete. The mine has produced not far from $6,000,000, and its heaviest output was that of the last six months, namely, 8,588 tons bullion, at $190 a ton, $1,631,720. It is equipped with steam hoisting works, and machinery for framing square timber sets; the ore-bins deliver the ore into the Utah Central cars, the company having extended the track from the Frisco depot to the mine. They have three 30-ton smelting stacks at Frisco, connected with the mine by rail, and five 60-ton stacks at Francklyn, on the Big Cottonwood, between the Utah Central and the Rio Grande Western tracks, six miles south of Salt Lake City. The latter are amongst the best works of the kind ever built. They have every modern improvement and appliance and run like clock work. The company own extensive lead refining works in Chicago. The affairs of the company are well managed; they are well equipped for a great business; are paying dividends of $300,000 per quarter, and evidently have a long and prosperous future before them if their ores continue fertile in going down. Total dividends paid, $1,400,000.

Frisco is the headquarters of the Frisco Mining & Smelting Company, capital, $2,000,000 in 80,000 shares; President and Manager, C. D. Bigelow of New York. The property consists of a 50-ton smelter and complete dry concentrating mill at Frisco; the Carbonate mine at Frisco; the Cave, Bigelow and other mines and prospects in Granite Range; and 800 acres of placer ground at Osceola, Nevada. The Carbonate is a strong fissure vein in trachyte, opened by a series of levels 200 to 600 feet long, down to the 600 level. The vein matter is trachyte, mainly, light and soft, mixed with rich argentiferous galena in the proportion of three or four parts of the former to one of the latter. Hence the necessity for concentrating the ores. The mine has steam hoisting works and furnishes its own water. The Cave is a series of ore-filled caves in limestone, appearing to have a general dip or strike as if in a sort of immense fissure or ore channel. A tunnel has been driven into the mountain 700 feet, and ground broken for 200 feet on either side of it. The ore at first was mainly limonite, carrying $30 in gold and silver, a natural flux. Deeper in the mountain it has become more of a lead ore. The works have produced about $150,000 in lead, silver, and gold, in the last six months.

The Lulu, the South Horn, and the North Horn, are locations south and north of the Horn Silver, supposed to be on the same contact fissure. There is a great vein of highly mineralized rock in all of them, but no clean ore rich enough to pay has been found in available bodies. They are regarded as very valuable and promising ground, however, and as requiring only money and work to prove them so. There are of course a hundred other locations in the vicinity; but they have not reached the productive stage.

Over the mountain, three miles or so to the northwest, in Copper Gulch, there is a valuable ledge or deposit of copper-silver ore, upon which the Cactus and Comet are the principal locations. The outcrop is distinguishable for a width of 50 feet and a length of 3,000. The ores are mainly sulphurets of copper, with considerable gray copper very rich in silver, and are distributed through the vein matter, which, like the enclosing country is an imperfect friable granite, and much lighter than the ores. After coarse crushing the ores can therefore be easily separated from the vein material by the use of jiggers, the vein furnishing the needed water. They should then be reduced to a regulus or matte on the spot. Although but little has been done on them it is not too soon to say with confidence that systematically developed and economically and judiciously managed, these properties will prove a source of great profit to their owners.

PINE GROVE DISTRICT

Is in the Wah Wah Range, 30 or 40 miles west of Frisco. There are a number of locations and the Carrie Lucille has been opened to a depth of 200 feet, showing a strong vein of high-grade ore. The Red Rover is a vein of carbonate of good grade at a depth of 40 feet. It is a new district and little can be said of it as yet.

MARYSVALE

Is the town of Ohio and Mt. Baldy Districts, on the higher tributaries of the Sevier River, in Piute county, one of the best endowed parts of Utah; fine water, timber, and grass, high up, cool and pleasant, and good air. The Deer Trail, Green-Eyed Monster, and Cliff locations, generally known as the Deer Trail, constitute a valuable property, requiring only adequate reducing works to become dividend-paying. The ore in general carries about an ounce of gold per ton, and as much value in silver, and there are 100,000 tons blocked out by winzes and galleries. The Copper Belt is the name of a group of valuable locations incorporated in Connecticut. The mine is opened to a depth of 300 feet, and on the strike about 150. They have a 10-stamp mill just started, and beginning to run out bullion. The ore is rich and is continuous so far, the vein being twelve to twenty feet wide. Hoisting is done by a whim. Adjoining the Copper Belt are the Mammoth, Copper Chief, Senora, and several others, mere prospects as yet. In Bullion Canyon there are the Bully Boy & Webster, a strong vein of $40 ore, two shafts 100 feet deep: Chattanooga, Sunday, Red Jacket, Ferris, Giles, Star, Estella, Mohawk, Belle of the Vale, Senor O'Flannigan, Beecher, Sierra Nevada, Pluto, Fillmore, Homestake, Clyde, Crystal, Gov. Murray, Grant, Moose, Occident, Silver Hill, Silver Fleece, and twice as many more. On many of them considerable work has been done, rich ore taken out, and they stand a good show to make mines. The district needs capital badly. It is about ninety miles from the Utah Central at Juab to Marysvale.

ANTIMONY.

Some forty miles east of Marysvale, still on Sevier River water, in Coyote District, Iron county, is the property of the American Antimony Company, of which company

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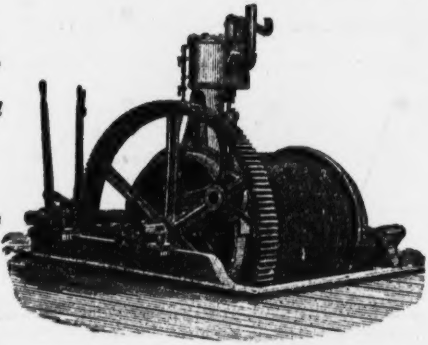

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COLORADO IRON WORKS,

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Anthony Godbe of Salt Lake is the organizer and manager. It consists of twenty-five locations, comprising 450 acres, consolidated. The ore occurs in strata between conglomerate and sandstone, and it is probable from workings already made that the yield will be 1,000 tons per acre. It appears to be purer in its native state than Cookson's best imported refined "star metal." An analysis of this, made by Messrs. Booth, Garrett & Blair, of Philadelphia, and of these ores, made by Prof. Lehman, of Baltimore, given below, exhibits this:

COOKSON'S REFINED STAR METAL.		AM. ANT. CO'S. SULPHIDE ORES.	
Arsenic	1.008	Metallic Antimony	71.320
Copper	0.021	Sulphur	28.130
Lead	0.410	Quartz	0.038
Iron.	0.144	Iron	0.005
Cobalt and Nickel	0.013	Arsenic, Tin	None.
Sulphur	0.064	Copper, Lead	None.
		No other substances present.	

With the exception of the 0.005 of iron, this ore is chemically pure, the formula for pure sulphide of antimony being:

$$\left.\begin{array}{l}\text{Sulphur}\\ \text{Antimony}\end{array}\right\}\begin{array}{l}28.6\\ 71.4\end{array}=100$$

This ore producing the purest antimony made, and there being a world of it, Utah promises to supply the world with its antimony. The company has purchased extensive premises at Sandy, on the Denver, Rio Grande & Western, and Utah Central railways, and will at once erect reduction works. The services of a competent antimony smelter have been secured, and he has arrived from England and will superintend the building of the reducing works and have charge of them when completed. The success of this enterprise may therefore be regarded as an accomplished fact. Utah is full of such unique things, awaiting the coming of the brains necessary to detect their value and make use of it.

SILVER REEF.

This town is named from the sandstone reef which fronts the Wasatch for 100 miles, and contains a stratum or perhaps strata not differing much from the enclosing strata in appearance, yet impregnated with silver to the extent of $30 to the ton. It is in Harrisburg District, Washington county, 100 miles south of Milford, in the Rio Colorado Basin. The country is sandstone, bare of vegetation; the mountains precipitous and flaming; the lower interspaces abounding in black volcanic rock; the whole sometimes likened to a vast furnace, still red-hot from the cremation of a world. Most of the mines are incorporated and consolidated.

The Christy Mill & Mining Company owns sixteen locations, about 280 acres, nearly all adjoining, forming a compact body. The principal mines are the Stormy King, Tecumseh, Silver Flat, Maggie, and California. The last two are equipped with first-class steam hoisting works. The ore is sandstone between sandstone walls, and is free milling, mainly chloride. It dips from the eastern horizon 15°. In the Tecumseh, Maggie, and California it has been followed 900 feet west from the croppings, and at that point is but 150 feet below the surface. In four and a-half years the Company has taken out 50,000 tons of ore, which has produced (bullion 940 fine) $1,276,355.79; yield per ton, $27.75; cost of mining, including prospecting and hauling to mill, $7; cost of milling, $4.35. There is a 5-stamp mill which for fifteen months has crushed 48 tons of ore per day—9½ tons per stamp. The product for July was $40,000. Prospecting is far ahead, and there is ore in sight to run the mill two years. It grows better with depth. It will be seen that this is a fine property. It is incorporated in San Francisco; capital $6,000,000, in 60,000 shares. President, Robert N. Graves; Secretary, Geo. R. Spinney; Superintendent, Henry S. Lubbock. It is a close corporation, ten gentlemen owning all the stock. It has never been listed on any exchange, and from the start has kept clear of debt and earned handsome dividends. The enterprise has been exceedingly well conducted both in San Francisco and at Silver Reef.

The Stormont Silver Mining Company is a New York incorporation, and owns the Stormont, Thompson, McNally, Last Chance, Buckeye, and Savage locations. They are worked through two shafts, which are well equipped with steam pumps and hoist and with safety cages. One shaft, 245 feet deep, strikes the vein 560 feet (on its dip) from the outcrop. There are four levels, each 1,500 feet long, connected by winzes, and sinking for the fifth level is well advanced. Much stoping ground above the fourth level is yet untouched. The ore is found anywhere within a certain zone, from ten to 100 feet thick, limited by red sandstone above and white below, often in association with fossil remains and petrifactions of reeds and rushes. The deposits vary from a few inches to several feet in thickness, are 50 to 200 feet long, and 100 to 300 deep, sometimes connected with other bodies by stringers, sometimes not at all. The common grade of workable ore bodies is about $30 a ton. It crushes easily (7 to 9 tons per day to the stamp) and mills up to 80 or 85 per cent. in bullion 950 to 980 fine. The Stormont mill is on the Rio Virgen, six miles from the mines, is run by water, and has ten stamps, thirteen pans, and seven settlers. The cost of mining is extremely variable, between $8 and $15; of hauling to mill, $2,08; of milling, $3.50. In three years the mill has reduced 44,675 tons of ore, which has produced 976,934 ozs. fine silver=21.87 ozs. to the ton. Dividends paid, $145,000. The records of the Company show a steady production with moderate profit, and the prospect is good for long-continued success in the future. Chas. S. Hinchman, of Philadelphia, is President of the company, and W. I. Allen, of Silver Reef, is Manager.

The Barbee & Walker Mill & Mining Company is a New York organization, incorporated on the consolidated Barbee & Walker locations, embracing somewhat more than half a mile in length of the White Reef. Hoisting from the main incline, which is 500 feet deep, is done by steam, and the ore is delivered directly on the floor of a 5-stamp mill, which has pounded out in five years a round million. R. T. Gillespie is the Superintendent.

The Leeds Silver Mining Company, a San Francisco organization, was the pioneer of the district. It owns a group of locations and a 10-stamp mill. It has taken out more than $800,000, and paid $78,000 in dividends. In all of these mines the silver-bearing rock is remarkably uniform, both as to richness and thickness of the stratum. The best geologists differ as to whether it came by sublimation, or was precipitated from a silver ocean, but they do not differ as to the probability of its great extent downward. The silver-bearing part of the Reef is known to be fifteen miles long, and Captain Lubbock is authority for the statement that there are groups of locations practically unimproved and producing nothing of any consequence, which in all probability are as good as those belonging to the companies mentioned, and which could be purchased at very reasonable figures, consolidated, provided with a light mill plant, and made dividend-paying properties. Amongst these locations may be placed the Lulu, Independence, McKelvy, McMullin, Gisborn, Emily Jane, Vanderbilt, Butte, Stormy King, Grey Eagle, Duffin, Toquerville, Last Chance, May Flower, Lamb & Steele, Thomas James, Susan, Romulus, Napoleon, Gibfried, Silver Plume, etc.

Deposits of rich copper ore are found in the sandstone near the Colorado River, from some of which the ores are shipped East; at Grand Gulch they are being smelted on the ground. Certain districts in Northern Arizona—the Gold Basin, Mineral Park, and Cerbat—find their nearest source of supplies at Silver Reef. Mining in them is reported as in a prosperous condition. There are some districts about Silver Reef, but so far they have done nothing in the producing stage. It is almost certain that other parts of the White and Buckeye reefs will some day be made as productive as that herein described, which has produced about $4,000,000 in five years, one-third of it profit.

MILLING AND SMELTING.

There are 20 mills in Utah with 350 stamps or their equivalent, with perhaps 100 pans and settlers. The cost of a chloridizing mill is $3,000 to $4,000 a stamp; of a gold mill, about $1,000. The cost of mining and milling has been given as far as it could be ascertained. There are four smelting stacks for lead ores at Frisco, one at Milford, and one at Park City, but the Swansea of Utah is the Jordan Valley between Salt Lake City and Sandy, 12 miles out. In this vicinity on the two southern railroad lines and on the waters of the Cottonwoods and lesser Wasatch streams, there are 19 lead smelting stacks, 5 Horn Silver, 4 Mingo, 4 Germania, 1 Hanauer or Morgan, 5 Old Telegraph, the latter laid up. The sampling mills are at Sandy and in Salt Lake. Ordinarily, only the 5th or 6th sack of a lot of ore is sampled, and it costs a dollar a ton for the lot. If the whole is sampled, it costs $4 a ton. The sampler crushes to the size of peas, and sends sealed packages to the assayers, upon whose certificates it is sold or bought. The smelters have no schedule prices for ores. In buying, they take the lead and silver in them at New York prices; deduct five per cent. for loss on gold and silver in smelting, and ten per cent. on lead; $26 freight per ton of bullion to New York; $16 to $18 per ton of bullion for refining; and $10 to $12 per ton of ore for smelting. They probably do as good work in this line as is done anywhere in this country. The ores of Nevada and Idaho are sent to the Salt Lake market in greater quantity every year. At a smelting works there must be power for crushing and for making blast. The cost depends on the number and kind of stacks; a stack by itself, exclusive of power, may cost $5,000. Fluxing is generally induced by the simple mixing of ferruginous with silicious ores. Sometimes limestone has to be introduced to secure the proper equilibrium. The cost is from $8 to $18 a ton, according as silica or sulphur, or both, are present in the ores. The iron ore chiefly used is a brown hematite from Tintic, furnished and delivered at $7.50 a ton. Connellsville coke, worth $23.50 a ton, delivered, and charcoal at 10 cents a bushel (15 to 20 elsewhere in the Territory) are used for fuel. It is believed that Utah coke will ultimately supersede the imported article, but it has not as yet.

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Kustel's process of treating silver ores, either naturally or artificially chloridized, by leaching with a solution of hyposulphide of soda, and precipitating with sulphide of calcium, has been tried in Utah, notably at the Old Telegraph works on the Jordan, and here the cost of leaching proper, at the rate of 100 tons a day, was 28 cents a ton. Roasting base ores with salt chloridizes the silver, and costs, usually, from $3 to $5 a ton. It is then ground in pans until the charge of quicksilver takes up the silver. Some think that leaching may be advantageously substituted after chloridizing for the usual pan amalgamation.

The cost of mining in Utah, including dead work and hauling to mill, probably averages $10 a ton. In Northern Utah and about the smelters, laborers command from $1.50 to $1.75 per diem; miners from $2.50 to $3.50. In the sandstone country, and generally in the south, wages are 25 per cent. higher. Supplies are perhaps 15 per cent. higher in the mining camps generally than in Salt Lake City and the chief towns. In these, farm produce, hay, grain, flour, and fresh meats, are about as cheap as in the States. Groceries are imported, and necessarily bear the additional cost of freight. Of mining machinery and hardware the same may be said, but Utah has the advantage of competition in this respect between San Francisco and the East. Most of the fuel used for power is brought from the coal mines on the Union Pacific Railroad, and in Pleasant Valley, and costs in Salt Lake City and in the Jordan Valley, $4.50 to $6.50 a ton; at the Bingham Canyon or Cottonwood mines, $8 to $10; the cost in both cases being chiefly freight. At Park City the supply is drawn from Coalville, and it costs $5 to $6 a ton, wood being $5 a cord.

In this review it was not possible to notice every mining district, but only those of most importance, and the same may be said of the mines. There is a mining district in the northwest, (Tecoma,) and in the extreme west, (Deep Creek,) west of Deseret (Detroit); there are the Willard and City Creek districts, and others of considerable importance, in which, for different reasons, not much is now doing. They will all be heard of in time, however, and to advantage.

THE GERMANIA LEAD WORKS

Is a recent successor to the Germania Smelting & Refining Works. They are on the Big Cottonwood, seven miles from Salt Lake City, by the Utah Central and Rio Grande Western railways. The works comprise everything necessary (or will when fully completed) to produce from the ores Dore bars, litharge, and all kinds of lead, common, refined, white, sheet, pipe, shot, and test lead. The latter is chemically pure and is a specialty. The company introduced the use of fine lead obtained from silver-lead for corroding purposes in this country. They have four stacks of a daily capacity of 180 tons; refining capacity (using the sinking process,) 40 tons a day; white lead capacity, 3,000 tons a year; piping, sheet and shot lead, in proportion. English coke is used throughout the business. Perhaps the English company preparing to make coke at Wales, Sanpete county, will obviate the necessity of this. All the buildings are substantial, well arranged, and well appointed. Thus a new branch of manufactures is being established by an organization competent in every respect to carry out its purposes. The business is in charge of Mr. F. W. Billing, and to his ability and enterprise is due this important addition to Utah's industrial resources. The company is a California incorporation, capital $500,000 in 5,000 shares; J. G. Kellogg is President.

IRON AND COAL.

The ores of iron occur all over Utah Territory in great variety. There are beds of micaceous hematite sixty feet thick at Smithfield, Cache county. About Ogden occur deposits and ledges of various kinds of iron ores. On the Provo, below Kamas, on the Weber and in the Ogden Canyon; on the Wasatch, above Willard and above Bountiful; in City Creek Canyon, at Tintic, in the Cottonwoods, scattered over the desert, bursting out of the mountain slopes—in the North, the Centre, the South, the East and the West—iron ores in all variety, save the spathic ores alone, are found. Many of the silver mines have a stratum of iron ore, carrying enough silver to make it valuable, aside from its use in fluxing silicious ores. In all of the eighty mining districts of Utah it is probable that iron ores are more plentiful than any other. Some of the more prominent and accessible deposits have forced themselves into notice, but there will not be much definite knowledge, either of the quantity or quality of our iron ores, until somebody shall have established the business of iron-making in all its branches in Utah. Attempts have been made in this direction in Iron county and at Ogden, but the conditions have thus far been such as precluded the possibility of success. For the purpose of fluxing silicious silver ores, the iron cropping out on the slope of the Wasatch, above Willard, some deposits in Morgan county, near the line of the Union Pacific, some in the Wah Wah Range, 25 miles southwest of Frisco, and the Iron county deposits have been drawn on to a slight extent. The chief source of supply of the Sandy smelters has been in Tintic Mining District, and occurs in a belt about 300 yards wide and 1½ miles long, striking northeast and southwest, lying on the mountain side sloping toward Dragon Hollow, which leads from Silver City upward to the summit of the Oquirrh Range. A hundred thousand tons has been quarried out of this belt in different places; the quarries may be 100 or 200 feet long, and carried into the hill 40 or 50 feet, gaining a breast in that distance 40 or 50 feet high. It is easily selected so as to yield 50 to 60 per cent. of iron, and it generally carries a little silver and gold.

THE IRON COUNTY DEPOSITS.

The most important iron ore deposits known in Utah are in Iron county, about 300 miles south of Salt Lake. The iron belt is two miles wide and extends from three miles north of Iron Springs southwestwardly to within three miles of Iron City—sixteen miles—crossing a spur thrown out northward from the Pine Valley Mountains, which rises perhaps 1,500 feet above the plain, and is called Iron Mountain. The southern end of the belt naturally gravitates toward Iron City, the northern end toward Iron Springs. The centre of the belt for six miles has but one prominent iron outcrop, called "Desert Mound." The Iron Springs group of mines are all within three miles of Iron Springs, part on the northeast, part on the southwest. The Iron City group begin three miles northeast of Iron City, and extend four miles. These two groups and the Desert Mound include the entire outcrop of iron that is apparently worth taking up. They cover in all some fifty claims or locations, and sum up, if patented 600 feet in width, including 240 acres of patented ground, about 1,000 acres. Probably one-fourth of them are not worth patenting. The country is granite and porphyry, with dykes of limestone, the latter important as a flux.

The ores are magnetite and hematite, and different outcrops have been tested sufficiently to satisfy Prof. Newberry, who had samples assayed at Columbia College, that they afford a practically unlimited quantity of fine Bessemer ore. Practical iron workers concur in saying that they are very remarkable deposits, whether considered with respect to quantity or quality. One said to the writer that they exceeded in extent and apparently in quality the famous Iron Mountain and Pilot Knob deposits in Missouri. He could not compare them with the Lake Superior deposits, because he had never seen them. It is estimated that 3,000,000 tons may be seen in the "Blowout" alone, above the surface of the contiguous ground. Other deposits expose their million tons each, although but little effective development work has been done. There are probably 50,000,000 tons of iron ore embraced in these claims, above, and within easy reach, below the surface. Not all pure ore, but including many ledges or deposits, practically inexhaustible and of superlative quality, sufficient, without intermixture, save with each other, for the production of Bessemer iron and steel. Prof. Newberry says of them:

"The deposits of iron ore near Iron City and Iron Springs, in Southwestern Utah, are probably not excelled in intrinsic value by any in the world. The ore is magnetite and hematite, and occurs in a belt fifteen or twenty miles long and three or four miles wide, along which there are frequent out-crops, each of which shows a length and breadth of several hundred feet of compact massive ore of the richest quality. There are certainly no other such deposits of iron ore west of the Mississippi, and should it be found practicable to use Utah coal for the manufacture of pig and bar iron and steel from these ore beds, it would be difficult to overestimate the influence they would have on the industries of the Pacific Coast."

A letter published from Mr. Brittan, a prominent Philadelphia iron-master, says:

"Some time ago I analyzed a number of samples of iron ore and limestone from Southern Utah, (it was from these mines) and have information as to the magnitude of the deposits. At first, I was somewhat inclined to discredit the statements, but afterwards had them confirmed by a well-known English iron-master, who had himself visited the locality. I now hold the impression that these deposits are among the wonders of the world. If such coke as you sent me can be be produced there in quantity, Utah's iron resources must exceed those of any other section in the Union."

The analyses spoken of were five, and were made for iron, phosphorus, and sulphur only. The average result was, of iron, 64 per cent.; of phosphorus, 12 per cent., sulphur, practically none. Mr. W. A. Hodges, of Salt Lake, analyzed two samples—No. 1, of magnetite, No. 2, of hematite—for the writer, and obtained the following result:

	Iron.	Phosphorus.	Sulphur.	Silica.
No. 1	62.60	none.	.12	4.8
No. 2	60.90	none.	.08	5.7

Mr. Brittan analyzed a specimen of the limestone near Iron City, finding of carbonate of lime, 80.35 per cent., and of insoluble silicious matter, 10.92 per cent.

WATER—FUEL—COAL.

There is but little surface water at Iron Springs or at Iron City, but good water in plenty can be got out of wells fifteen to thirty feet deep. At Cedar City, between the iron and coal deposits, there is plenty of running water for iron works of any possible magnitude. There is enough timber in the country to furnish charcoal at cheap rates for some years. There is coal in the vicinity of Iron City, but probably laid

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down in too small basins to be of much account. There is coal outcropping for fifteen miles in the face of and near the top of the Wasatch (called Cedar) Mountain, back of Cedar City (east,) probably extending east, the Range here being a mesa (table-topped,) ten to twenty miles. It has been coked on the ground, and, it is affirmed, answered well in the Horn Silver stacks at Frisco. Speaking to this point, Prof. Newberry says:

"Within fifteen miles of the iron ore beds, and separated from them by a nearly level plain, are deposits of coal which I believe can be successfully used for smelting iron, and which are certainly capable of furnishing a fuel that will perform all the other duties of coal, and that in inexhaustible quantities. These coal beds are connected with the coal fields of Eastern Utah, but it is only here that they push through the mountains into the 'railroad valleys' which lie between the Wasatch and the Sierra Nevada. Several beds of coal here crop out on top of Cedar Mountain, beds which vary from 5 to 18 feet in thickness. The coal is of the Cretaceous Age, and equal in quality to any of the Wes'ern coals. It makes a fairly good coke, apparently as good as that manufactured at Trinidad, Colorado, and so extensively used for metallurgical purposes in that State. It is fully equal to the coals of Central and Northern Utah; hence it will probably furnish a fuel adapted for smelting and manufacturing iron."

UTAH COAL FIELDS.

There is coking coal at Wales, in Sanpete Valley, connecting *via* the Sanpete Valley Railway with the Utah Central at Nephi. A thousand tons were made there a few years ago and sold to the Sandy smelters. But they had a poor plant for washing and coking, and too long a wagon-haul, and so could not make it a success, economically. The Sanpete Valley Railway Company own eight miles along the strike of a four-foot vein of coal pitching under a heavy mountain—10,350 acres—and they intend to set up the best possible coking plant and enter upon the manufacture of the article. Coke has also been made in Pleasant Valley, a great coal-field lying east of Sanpete Valley, and there is no doubt that selected coals of the great coal-field in Castle Valley, adjoining Pleasant Valley in the south, will make coal. Mr. Blodgett Brittan, the iron man before cited, gives the following analysis of the coal and the coke from it:

	COAL.	COKE.
Volatile matter	40.61	2.70
Fixed carbon	48.21	94.05
Ash	1.88	3.25

A. P. Bouton, M. E., reporting on the coal veins of Sanpete Valley, says: "The coal is of a dark brown color, highly stratified, as it naturally would be so near the surface, having been exposed for vast ages of time to the oxidizing forces of nature, carrying in the lines of fracture the scales of sulphate of lime, increasing the percentage of ash. These mineral salts must of necessity prevail here, being deposited by the water-carrying minerals in solution. The salts disappear very rapidly in going in on the veins, and in proportion as you get beyond the brecciated rocks overlying the outcrop through which these mineral waters have been filtered. Samples obtained about forty feet in depth from the surface, by analyses yield as follows:

Moisture	1.8
Bitumen	34.2
Coke, exclusive of ash	50.7
Ash	13.3

This coal, by distillation, makes an excellent article of coke, having a fine metallic lustre, but is a little lighter than that obtained from the Cumberland coals. In the manufacture of iron an efficient and ample supply of fuel is the great desideratum. With an estimated area of 20,000 square miles of coal lands, extending from the northern boundary of the Territory to its southern border, there need be little or no apprehension of a deficiency of combustible material for some time to come."

The coal of Utah has a thickness of 165 feet, and lies mainly along the eastern slope of the Wasatch Range, from the Uintah Reservation through Pleasant Valley, on Huntington Creek, in Castle Valley, and on down to Kanab and Pahreah, on the Colorado River. The formation may have been entirely carried off by erosion in considerable areas, but it was all originally coal-bearing, and thousands of square miles of it have not been eroded away. Central Utah finds access to this vast coal-field through Spanish Fork and Salina canyons. The Denver & Rio Grande Western, now building between Salt Lake City and Denver, has already passed the Wasatch Range through Spanish Fork Canyon, and a branch from Tucker to Scofield in Pleasant Valley, where the company owns several square miles of coal, is in operation, and delivering coal in Salt Lake Basin at the rate of 50,000 tons a year. Utah has bought within ten years 500,000 tons of Wyoming coal at a cost of nearly $4,000,000. She will henceforth save one-half at least on that score. The coal is a good brown coal, and the vein thick enough so that a train of box cars can be backed into them to be loaded. The same company has projected and begun a branch road from Grand River through Salina Canyon into Central and Southern Utah. It is said that these roads are hardly out of sight of marketable coal banks from Gunnison, Colorado, to Salt Lake Valley. There is good coal on the Weber River and its tributaries, for ten or fifteen miles above Echo. These beds have been wrought for fifteen years. Some of them are opened to a depth of 1,000 feet, and are well equipped with steam pumps and hoist. The mines about Park City draw their supply from these deposits. The coal is an excellent house and steam-making fuel.

WILL IT PAY.

It has been said that "in order to justify an increase of the iron-making plant of the world, a place must be found where the materials for iron-production are plenty and contiguous to each other, where labor is intelligent and steady and reasonably cheap, where supplies are to be had at ordinary rates, where there is an ample and accessible market at hand, and withal far enough away from the iron-making world of America and Europe to defy competition." If there is such a place it is in Utah. The materials for iron-production occur in unlimited quantity in Iron county within 20 miles of each other. The railroad approaches to the Iron Mountain from all points are easy, and when the roads already projected and in process of construction are completed, the whole Pacific Coast will be in direct communication with these mines, and they will have an outlet toward New Orleans as well. These roads comprise thousands of miles, and of themselves, with their indispensable branches and feeders, will make a hungry market for Bessemer iron and steel, and also insure competition in the transportation of materials and of manufactured products. The Utah laborer is reliable, intelligent, and steady, and is contented with lower wages than the same quality of labor commands elsewhere. Many of them were born and reared in the coal and iron districts of Great Britain, and are familiar with all branches of the iron-making business. The staple foods for man and beast are more plentiful and cheaper and better than in most places, but such things as cannot be grown or manufactured in Utah are higher in price than at either seaboard or in the Mississippi Valley. Striking an average, however, it is safe to say that all needful supplies are to be had at ordinary rates. The product would need fear no competition nearer than St. Louis, 1,500 miles away. Colorado is not taken into account, because she lies east of the Mountains, and her iron ores will not suffice for more than her own wants. On the Pacific side we are protected by the duties on foreign iron and steel; on the east, by the cost of carriage over 1,500 miles of space, which, rated at twice the cost of transportation in New York State, would be $30 a ton. So far as known, there is no coal of account north or south or west of Utah in the United States, and no iron ores occur at all compared to ours. With great works, thoroughly equipped for all branches of the business, it is therefore not easy to see why we may not justly count on having and holding the entire Pacific Slope for a market for our product. The query, "Will it pay?" must be answered in the affirmative.

A CENTRAL LOCATION.

It might be good policy, however, to locate iron works more centrally as regards the Territory, than in Iron county. There are enough ores there to long outlast the fuel. There is coal there, and a good deal of it, but it is hardly true that it is inexhaustible, while it is substantially true of the coal fields in Central Utah, in Pleasant and Castle valleys. Commissioner Morrell (to Paris Exposition, 1878, Vol. 3 of Reports) says that nearly two-thirds of all the coal produced in Austro-Hungary in 1876 (8,000,000 tons) was lignite. "Until the present century," he says, "charcoal was the only fuel that was used, both in the furnaces and in the refinery forges; but now wood, brown coal, or lignite, and coke, are also employed. Lignite is used with excellent results in blast and puddling furnaces in Styria. In parts of Bohemia, Moravia, and Austro Silesia, coal is scarce or impure, and lignite and wood are used." It seems that a great iron industry has been sustained in these countries for a long period, with lignite as its chief fuel. Colorado is building up an iron industry on the same fuel. Her lignites are no better than those of Utah. There is no reasonable doubt that our coal will answer every purpose in connection with the business.

As to the contiguity of the iron and coal, were iron works established on the Sevier River where the Utah Central Railway strikes it, about 100 miles south of Salt Lake City, they would have unlimited room and unappropriated water; they would be in the great farming section, and easily accessible from all quarters; they would be within 100 miles of the great central coal fields, and equidistant (180 miles) from the Iron county and Cache Valley iron deposits, the extremes on either hand. The average haul of materials could hardly exceed 100 miles. It would cost $4 to get the material for a ton of pig iron together at that point, allowing twice the actual cost of freight carriage in New York State. This is far less than the average cost in this country, where, as Mr. I. Lowthian Bell, M. P., says in his report to the British Government, "it may and does happen that distances of nearly 1,000 miles intervene between the iron ore and the coal"; and where, as Commissioner Morrell says, "nearly one-third the cost of all the finished iron and steel made is created by unavoidable railroad transportation." This locality would be 600 to 800 or 900 miles only from every live centre of industry on the Pacific Slope, including San Francisco. Pig iron, made at this point, or at the point named above, could hardly cost more than $10 a ton, and at $1 per ton per 100 miles freight to San Francisco, say 900

GEO. A. LOWE,

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AGRICULTURAL IMPLEMENTS

Ames' Portable Engines,
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—ALSO,—

IRON, STEEL, HORSE SHOES,

AND

All Kinds of Wagon Material,

SALT LAKE CITY and OGDEN.

miles, it could be delivered there $4 or $5 cheaper than the ordinary price there. The same or a greater difference in favor of Utah manufacture would obtain for bar iron, which costs $60 a ton in Pittsburg, and $30 a ton freight to San Francisco. By the time works can be established, the railroads will be done, and there is an immediate and profitable market at our doors, which we can at once command. Of course the conditions of the problem would not be materially changed by the location of the works at Salt Lake or Ogden.

THE OGDEN IRON WORKS.

After many vicissitudes, the Ogden Iron Works seem to have fallen into the right hands, and are about to be made to test this problem practically. Mr. C. W. Scofield, a large stockholder in the Denver & Rio Grande Western, and Mr. Jones, an Eastern iron man of experience, have secured control of the property, and have just commenced operations. They own thirty-three acres of land near the junction of the four railways entering Ogden, a 45-foot stack, with lift and hot-blast oven, rolls for railroad and bar iron, lathes, drills, planers, and a full complement of tools for a machine shop. Pig iron, some kinds of rolled iron, and certain castings, including stoves, which now cost three times what they ought, will be first made. Charcoal will be used for fuel. then coke, and perhaps our brown coal, at least in part. They have no doubt that they can make a satisfactory coke from the Pleasant Valley coal. Good coke is made from coal with exactly the same constituents. We have imported within ten years 70,000 tons of coke at a cost of $1,800,000. He will be worthy of the laurel who succeeds in stopping this drain. If good ores can be found within a reasonable haul, and our coal can be used for fuel, the Ogden iron plant will be gradually increased, until there is none larger. The four great iron-producing districts of the United States are Pennsylvania, Michigan, Missouri, and Tennessee. There is nothing required but setting about it to make Utah the fifth. It is older now than the iron country in Michigan is, which is exporting more than 2,000,000 tons of iron ore per year, worth at the furnaces $8 per ton; worth at the mine dumps $3 per ton, or a total of $6,000,000. Michigan has a market for her ores, it may be said. Utah has a market for the manufactured product, which is very much better. Pittsburg, and Cleveland, and other places take Michigan's $6,000,000 worth of raw material, and, providing the fuel, of course, turn it into thirty or fifty millions. Utah can do all that herself, but it wants iron men and iron men's money. And that is all it wants.

OTHER MINERALS.

Sulphur is formed by the condensation of escaping sulphur fumes from volcanic laboratories. There are several beds of it in Utah, most important of which is one in Millard county, fifteen miles from the route of the Utah Central Railroad. It covers nearly 300 acres, and of many openings made by shaft and cut none shows it to be less than twenty feet thick. At that depth the still active exhalations become intolerable. Some of it is .98 fine, but the average is about .65; the sulphur beds of Sicily being .20. The commercial value of the Utah find is chiefly a question of transportation. Rock salt, much of it almost perfectly pure, is mined in Salt Creek Canyon and on the Sevier. The northern part of Utah abounds in salt springs, perpetually pouring into Salt Lake. The brine of Salt Lake is about 17 per cent. solid matter, averaging the lake, 85 per cent. of which solid matter is salt. As evaporation of this water proceeds, the glauber and epsom salts naturally separate from the common salt, so that much of the article manufactured is .97 fine. The sun makes thousands of tons every season, as the annual spring tide of the lake recedes from its ragged and shelving shores, most of which is left to be reabsorbed by the yearly returning waters, there being no adequate demand for it. Perhaps 5,000 tons a year are used, chiefly in chloridizing silver ores. For this purpose it is sent into adjoining Territories to some extent. The price in Salt Lake City of the crude article is ~~five~~ Three or ~~six~~ Four dollars a ton. A good salt for table and household use is manufactured from the sun and shore product of Salt Lake. Certain salt springs twenty-five miles east of Montpelier (in Wyoming) yield a salt comparing with Liverpool and Salt Lake salt as follows:

	Pure Salt.
100 Parts Bear Lake Salt	97.581
100 Parts Liverpool Salt	94.227
100 Parts Salt Lake Salt	79.100

The residue from the first contains less sulphate of magnesia than that of the last two. Gypsum, both in the crystallized and oxidized state, is very plentiful in Utah, the most noticeable beds or ledges being in Sanpete county, above Cove Creek, on the Muddy, and especially near Nephi. There is a vertical ledge of gypsum just back of Nephi 100 feet wide and 1,200 feet long, enough to supply all possible demand in the Rocky Mountains to the end of time.

In connection with the iron ore beds, the red and yellow ochres abound and are widely disseminated. In the Salt Lake Museum there are samples of lead, iron, and chrome pigments, Venetian red, fire-proof paints, chrome yellow, and green, and white and red lead, made from native ochres and lead. Yet no one seems to have produced these articles in quantity and quality to make them objects of commerce, or even to supply the home demand. The shale beds, underlying which, in strata not exceeding twelve inches in thickness, occurs what is called "mineral wax," appear to extend over an area of a thousand square miles, and to be from sixty to one hundred feet thick, the part rich in gas and paraffine oils twenty to forty feet thick with occasional thin seams of coal. They are cut across and exposed by Spanish Fork Canyon, and are similar in general characteristics to the wax-bearing beds of Galicia, in Austria. Whether these shales are rich enough to justify distillation, has not been tested on a working scale, but it is believed they are. Thorough prospecting with oil-well tools might develop a new petroleum district. The Promontory Range, which projects thirty miles into Great Salt Lake from the north, bears vast beds of alum shales, and a similar formation is met with in Sanpete county, on the Sevier, while alum, in combination with other minerals, is found almost everywhere. It has not been put to any use as yet.

Various kinds of soluble salts, appearing generally in shales or as a surface efflorescence, sometimes several inches in thickness, are found in different localities in Utah. Near Independence Rock, Emigration Canyon, the carbonate of soda exuding from the ground was used by the first immigrants in making bread, and it answered very well. On the Salt Desert, west of Great Salt Lake, there are great quantities of saleratus, and in many places in the south there are shales and beds of exuded salts, thick and extensive enough to justify more attention than the subject seems to have received.

Much of the Tintic and other iron ores used in fluxing lead ores, and supposed to be fifty to sixty per cent. iron, is in truth about forty per cent. iron and twenty per cent. manganese. This kind of ore is especially valuable in making Bessemer steel. There are veins of sulphuret of antimony, three to six feet thick, near Brigham City, averaging for the entire vein matter twenty to thirty per cent. antimony, some of it assaying twice as high. Once separated from the gangue, the antimony could be smelted with raw coal as cheaply as pig lead. Perhaps the separation might be accomplished by mechanical means. Antimony is worth eleven to twelve cents per pound. Mica abounds in Southern Utah, and in the range separating Weber from Salt Lake Valley, being exposed in City Creek and Farmington canyons. None in sufficiently large flakes to be of commercial value has yet been brought to light, but doubtless it would be were some one with means persistently to set about it. Clays of all varieties, brick-clays, clays for fire brick, fatty clays, potter's clays, and porcelain clays, or kaolins, are found in Utah in different places, west of Utah Lake, in Beaver, and Sevier, and Davis counties, and in many of the mines. The deposits west of Utah Lake, near Lehi, are quite remarkable, both as to quantity and quality. Fire brick are made from clay at Bingham Canyon, while in Frisco Mining District there is a fire-stone which has superseded fire brick in furnaces in that vicinity. It is soft and can be cut like soapstone, is in unlimited quantity, and hardens on exposure to the fire. Copper is found in nearly all of the mining districts of Utah. Tintic, Big Cottonwood, Snake District, and Beaver county are full of it. There are copper veins in Bingham Canyon and on Antelope Island in Great Salt Lake, and outbursts of very rich copper ores in the sandstone country of the Colorado. It generally occurs in connection with other metals. If the matting of copper-silver-gold ores, just introduced by Mr. W. H. H. Bowers at the Crismon Mammoth works, in Tintic, proves an economic success, it will be adopted in other localities, and an important addition made to our mineral output. Mineral discovery, and especially metallurgy, are as yet in the first stages of infancy in Utah. Nothing has been sought after but the precious metals, and incidentally, their almost universal matrix, lead. No one knows all the rare minerals available for commerce in the ores of the Territory, to say nothing of the ores still unearthed, the search for which has comparatively but just begun. Gold, silver, lead, copper, iron, coal, zinc, antimony, arsenic, sulphur, and salt are common and plentiful enough; but cinnabar, bismuth, cobalt, molybdenum, and perhaps some others, are known to exist, and bismuth, both at Tintic and in Beaver county, it is believed, in quantity and of a quality to be profitably worked.

Of building stone there is scattered all over Utah, and very accessible, every variety, and in inexhaustible plenty. Among the best and best known are the granite, from the mouth of Little Cottonwood Canyon; the true red sandstone of Red Buttes, near Salt Lake City, and the white secondary sandstone or oolite of Sanpete county. At Logan, an easily quarried square-breaking limestone, impregnated with iron, is largely used for buildings. Marbles, black, banded, variegated, cream-colored, gray, and white, all susceptible of a fair and some of them of a fine polish, are found at various points; as on the islands in Great Salt Lake, at Logan, Alpine City, Dry Canyon, on the Provo, at Frisco, and at Tooele City. The Logan marbles are beginning to be used some for slabs, furniture, mantel-pieces, etc. Antelope Island affords the best and largest slate quarry in Utah, so far as known. It is unlimited in quantity, green and royal purple in color, and is of as good quality as any slate of

DESERET

National Bank,

Salt Lake City, Utah.

Capital, $200,000.

Surplus and Profit, $150,000

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commerce, much better, indeed, for roofing, sinks, or billiard tables than the slate imported from the East. Fossils of the silurian, devonion, lower and upper carboniferous, permian, cretaceous, and lower and upper tertiary formations abound in Utah, and specimens of them as well as of petrified woods, volcanic products, obsidian glasses, magnetic sand, whatnot, may be seen at the Salt Lake Museum.

MANUFACTURES.

The following table exhibits the growth of manufactures in Utah:

	1850	1860	1870	1880
Number Manufacturing Establishments.	14	48	533	1,[illegible]66
Number of Hands Employed............	51	389	1,534	3,221
Capital Invested..........................	$44,400	$413,355	$1,491,898	$2.839.463
Value of Products.........................	291,223	900,153	2,348,519	4 217,434

An increase of 1400 per cent. in 30 years. The chief articles are flour, lumber, leather, boots and shoes, harness and saddlery, woolen fabrics, yarn and hosiery, charcoal, brick, lime, and beer. There are fifty or more flour-mills, as many saw-mills, twenty tanneries, twenty boot and shoe factories, woolen mills containing 5,000 spindles, ten furniture factories, and three foundries. The manufacture of bullion from ores, employing 200 stamps and twenty-five furnaces, if added to the value above given, would make it $12,000,000.

The yearly product of the woolen mills is valued at $300,000, which is about one-half their capacity, one-eighth of the Utah consumption of such fabrics, and they use one-fourth of the wool-clip of the Territory. With more capital, so that the business could be systematically classified or specialized, as between different mills, and perhaps a later and better style of looms be put in, they might run to their full capacity with advantage to the Territory and profit to themselves.

The tan barks cost about $5 a cord in sections where they are native. They could not be furnished in Utah for less than $35. So the extracts of chestnut, oak, and hemlock barks, and of sumac leaves, are imported for tanning purposes. Some of the pine barks of Utah are used. Under these disadvantages it is not strange that no more than $100,000 is invested in the business in Utah; or that Utah leather, while comparing favorably with California leather, is inferior to the Eastern article. There are 25 to 30 tanneries, and the value of their yearly product is carefully estimated at about $250,000. The business may be said to be growing gradually, both as to quantity and quality of product. But it can hardly become of great importance while tanning materials have to be imported. There is little doubt, however, that boots and shoes can be profitably manufactured in Utah from imported leather. There are 25 to 30 boot and shoe factories in the Territory, employing perhaps 500 hands, and turning out yearly $350,000 worth of boots and shoes. About six of these factories have machinery. Custom work, exclusive of repairing, may amount to $30,000 more. About one million dollars' worth of boots and shoes is annually sold in Utah, two-thirds of which, as will be seen, are imported. At the same time Utah is shipping away 200 car loads of hides and pelts a year, worth, in Salt Lake, $400,000, ample in amount to supply the entire demand of the Territory for boots and shoes. Probably $100,000 is invested in the business. The value of the harness and saddlery annually made in the Territory, including the hardware used, is roughly estimated at $200,000. This includes cost of material, which is chiefly imported, Utah leather, although used to some extent, not answering the purpose.

About $75,000 is invested in foundries and machine shops in Utah, the leading establishments being in Salt Lake City, and the yearly value of their products in the neighborhood of $150,000. They are well provided with the requisite tools, and can and do duplicate any kind of machinery in use in the Territory exclusive of railroad machinery and engines of more than 100-horse power. Their work is largely repairing, and although the big silver mills are generally made abroad, there is very little of their machinery that these shops have not duplicated. For their line of work existing facilities may be said to be quite equal to the demand upon them. There is a small foundry and machine shop at Logan.

There are probably fewer saw-mills in Utah than in 1875. when 128 were returned, but they cut out about the same amount of lumber, say 20,000,000 feet, worth $400,000. The value of imported lumber, rough and manufactured, is estimated at $200,000 yearly. The annual product of the Utah planing mills, flooring, rustic, moulding, doors, sash, blinds, frames, and brackets, is estimated at $100,000, including the value of the rough lumber, about half of which, flooring and part of the rustic, is imported. There are ten or twelve furniture factories, most of them on a small scale, turning out, yearly, $150,000 worth of furniture and upholstering, new work, the wood and other material for the best of it being imported. Made-up furniture, inclusive of freights, to the value of perhaps $200,000, is annually imported. Wagons were manufactured to a considerable extent formerly, but the business has nearly ceased on account of the close competition between dealers in Eastern-made wagons. All the materials have to be imported, and since the freight on the stock is the same as that on the wagons, there is no protection for the Utah manufacturer save the middle-man's commission, and that is offset by want of capital to furnish facilities, and the higher price of labor. The product of the mills and smelters, fine and base bullion, which is a manufacture as much as flour or lumber, was, at seaboard rates $8,000,000, last year, and will be $10,000,000 this year. The manufacture of charcoal, brick and fire-brick, salt, earthenware, lime, cements, paper, brooms, brushes, beer, cigars, hats and caps, willow-ware, artificial flowers, candles, soaps, glue, etc., is steadily growing.

OPPORTUNITIES.

There is not much to be said in favor of manufacturing in a new country, unless from materials native to it. Utah is as poor in valuable woods as it is rich in climate, soil, water power, and minerals, while the treasures of the last three are as inexhaustible as the pleasures of the first. Below are indicated certain branches of manufacturing industry which it is believed offer inducements to engage in them. It should be borne in mind that there is in some cases the cost of carriage both ways, out and back, and always one way in favor of the Utah manufacturer; and that there is no limit to the water power running to waste in a score of mountain canyons, if one will only go to it. Also, on the other hand, that much depends on the coking qualities of the Utah coals. It may, perhaps, be conceded that coke is made from some of them of sufficient consistency to bear the charges in the lead smelters, but not, as yet, to bear the weight of the charges in pig iron smelting. But the coal fields are of great extent, they have been but slightly exploited, and beds that will respond to the utmost that can be asked in a coking coal may be found as well in Utah as in

Colorado. The difference between coals is one of age and pressure under the application of heat. Coal of later age than the true coal formation may make the best of coke, as is experimentally proved by its occurrence at Trinidad, in Colorado. No doubt the supply will ultimately respond to the demand. In Utah's broken up coal fields it would be curious if somewhere the beds have not been subjected to sufficient pressure to make a good coking coal.

With the proper fuel, it is believed that the country west of the Missouri River does not afford a field for the manufacture of iron at all comparable to that lying unoccupied in Utah.* A great variety of rich and remarkably pure iron ores, in proximity to the requisite fuel and fluxes; cheap labor, provisions, and supplies; a central location and ample railroad inter-communication; a climate never interfering with operations in the open air; a large demand; and a freight tariff of from $20 to $40 a ton for the manufacturer's protection; or if he must ship it away to find a market, to pay the cost of shipment. The idea is that the materials and facilities are such as to justify the enterprise on a large scale, not the manufacture of pigs solely, but of all kinds of merchant and railroad iron and steel, and of all railroad, mill, mining and smelting machinery. Under the circumstances it would seem that at least one per cent. of the one hundred millions invested in the iron business in the East might be profitably transferred to Utah.

Metallurgical works equal in capacity and variety of appliances to any in the world, should be established in Salt Lake Valley. Ores from adjoining Territories now find their way in considerable quantity to the Salt Lake market. All ores not yielding readily to the lead smelting process employed here are rejected, and nothing is saved in the treatment but gold, lead, and silver, with sometimes a trifle of copper. With an establishment possessing the skill and means needed to separate all of the metals from their gangues and bases, whether chemically or mechanically combined therewith, or with each other, an incalculable stimulus would be given to mining. Great part of the ores of this whole region are neglected entirely, for want of the capital and skill to make any profitable use of them. Labor and materials may be cheaper in Europe, and Swansea may be from its seaside location the ore-reducing market of the round world. But our ores are far richer in metals as a rule than those of Europe, and the Rocky Mountains, easily accessible from Salt Lake Valley, are capable of producing more and more various ores, if put to the test, than all the world beside has been in the habit of furnishing. There can be no question as to the possible supply of ores or as to their variety and richness.

In connection with works for the treatment of ores there should be establishments for the manufacture of drugs and chemicals, oils, paints, and all the artificial products of lead, beside the refining of lead itself, and the making of pig and sheet lead, shot, lead pipe, etc.† The materials for almost everything in this line are here in profusion. As a writer who had traversed Utah with an observant eye has said: "The entire basin is a vast laboratory of nature, where all the primitive processes have been carried out on a scale so vast as to make man's dominion, at first sight, seem forever impossible." We now send our crude lead bullion East, and bring back pig and sheet lead, lead pipe, white and red lead, and Venice white, instead of refining and manufacturing here and thus saving one if not two freight charges across the continent, such freight charges swallowing up one-third the value of the product. Even blue-stone, used in amalgamating silver, is imported, with millions of tons of sulphur in sight, and the hills full of copper ores. And this is the practice in everything.

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* See ante, Ogden Iron Works.

† See ante, Germania Lead Works.

All the products of our fine clays and silicious sands—pottery, fire-brick, glass; of our marble and slate beds—roofing, sink bottoms, table and bureau tops, mantlepieces, billiard tables, might be made here as well as elsewhere and brought here. It has been shown that the manufacture of leather, boots and shoes, harness and saddlery, is by no means overdone; while in the working up of our wool crop there is ample room and encouragement. As with lead bullion, the bad habit prevails of sending our hides and wools abroad to be manufactured and returned, involving payment for two carriages across country when any carriage at all is superfluous. A start has been made in the manufacture of paper, but the single mill in operation makes only about one-tenth of the amount used. Some attention has been given to silk-raising, and silk-spinning machinery is beginning to be introduced. The worms and the mulberry trees both seem to do well in Utah, and there is no apparent reason why silk-raising and manufacture should not grow into an important industry. Some of these branches of manufactures may appear to be small matters; but it is a new country, and they are the beginnings of a larger growth. The scientific treatment of ores, however, and the manufacture of chemicals, paints, pottery, glass, lead, iron, copper, and woolen fabrics are believed to offer fair inducements to the skillful and enterprising investor.

RAILROADS AND TRANSPORTATION.

The settlements of Utah occupy a belt from ten to fifty miles in width in valleys on the western slope and at the base of the Wasatch Range, extending the entire length of the Territory from Franklin on the north to St. George on the south. There is what is called the State Road running through the principal settlements from Salt Lake City to St. George, and it is continued, though not under that name, from Salt Lake City northward to Soda Springs, in Idaho. Off from this lead the roads to the side valleys, through the canyons, as through Logan Canyon into Bear Lake Valley; up the Weber, through Morgan, into Summit, and thence down Parley's Canyon, or the Provo River, into Salt Lake Valley again; up Ogden River through Huntsville and on over rolling country into Cache or Bear Lake valleys; up Nephi Canyon into Sanpete county, down the Sanpitch to the Sevier, and up and down that river its whole length; and westward from Salt Lake City via the old overland stage route through Tooele and Skull valleys to Deep Creek, to Eureka, Austin, and Carson, in Nevada. The country generally offers no obstructions to road making by simply driving in one track except in the canyons. On many of the streams, even in the mountains, but little work is needed to make delightful carriage roads. In those canyons offering no passes over or through into other valleys watered by different streams, penetrated solely for timber or mines, the roads are rough and steep, and it is only by much labor that they were made or are kept passable. While in many places the country roads are hard and usually pleasant, as a rule they are, from the nature of the soil, very muddy in wet, and very dusty in dry weather. There were returned in 1875, 544 miles of territorial roads, 2,364 miles of county roads, 6 toll-roads, and 18 bridges costing $1,000 or more.

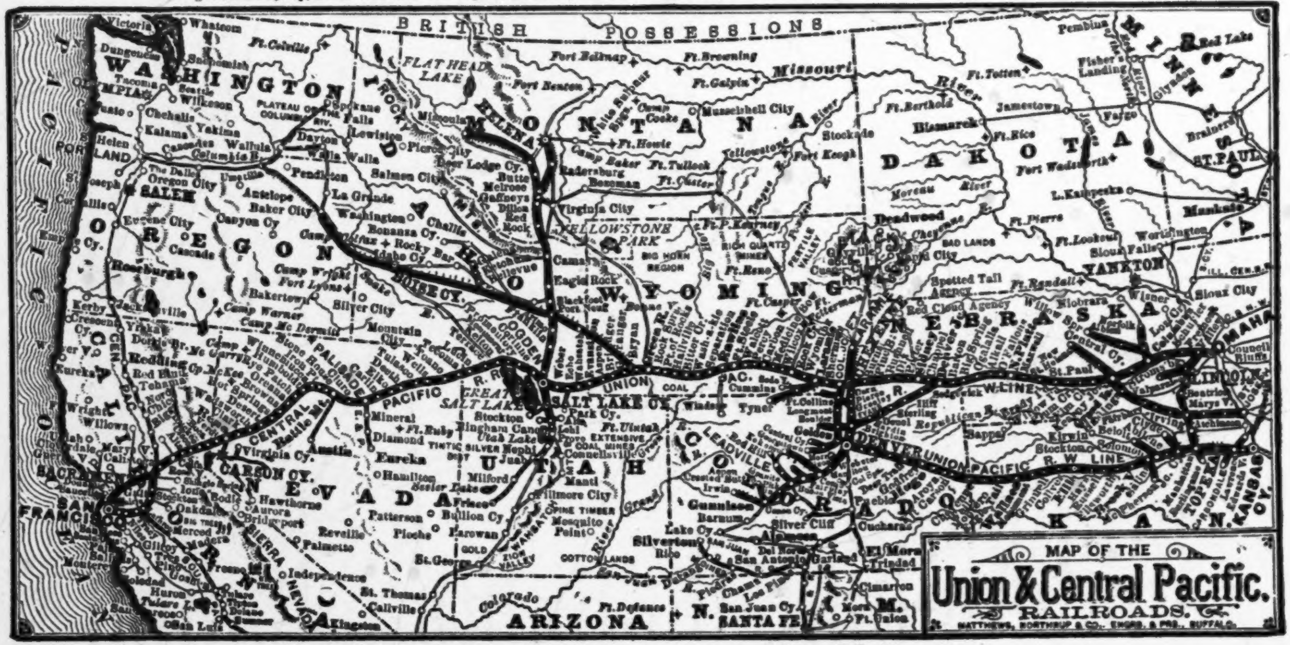
This system of intercommunication by wagon roads is being rapidly superseded by a railroad system, whose general features consist of a main north-and-south road through the settlements from end to end of the Territory, and continuing on until they intersect the northern and southern trans-continental roads, or find the ocean independently, with branches into the mining canyons and coal fields, all connected with the general railroad system of the country by the Union Pacific and the Central Pacific, and (soon to be) by the Denver & Rio Grande Western. There are of standard gauge railroads in Utah: Union Pacific, main line, 78 miles; Utah Central branch, 280 miles; Salt Lake & Western branch, 55 miles; Echo & Park City branch, 27 miles; Central Pacific, 148 miles; total miles, standard gauge, 588; narrow gauge, Utah & Northern branch Union Pacific (in Utah), 75 miles; Utah & Nevada branch Union Pacific, 37 miles; Sanpete Valley Railway, 28 miles; Utah Eastern Railway, 28 miles; Denver & Rio Grande Western, Bingham branch, 16 miles and 8 miles tramway; Wasatch & Jordan Valley branch, 7 miles and 7 miles tramway; main line to Denver, now completed to Horse Creek, beyond Summit of Wasatch, 106 miles; Pleasant Valley branch from Tucker, 20 miles; total miles narrow gauge, 317; total both gauges and tramway, 920 miles. The main continental railroad between the two oceans traverses the entire breadth of the northern part of the Territory, the two roads constituting the line joining tracks at Ogden, giving Utah important advantages from the competition between East and West. To come to details:

THE UNION PACIFIC

Is the great road in Utah to-day. As will be seen bv accompanying map, the system embraces 4,000 miles of road, consisting of the main line, 1,037 miles long, and 3,000 miles of branches exploring all parts of Nebraska and Colorado, extending in this valley from Milford on the south to Butte, Montana, 700 miles, and by the Oregon Short Line penetrating the heart of Idaho, and reaching the great and ultimate Northwest where rolls the Oregon. The extent, variety, and importance of the resources of all this vast region, opened up to the world by the great road, is illustrated by the fact that where a few ox trains and a daily stage line twelve years ago supplied its transportation facilities, it now pays $100,000 a day for these indispensables. It is not within the scope of this review to dwell on the resources of sister commonwealths, but it may be said of Idaho that she is truly the "Gem of the Mountains," as the name is interpreted. She has revealed a wealth of ore in the last three years which has startled the mining world and will place her in the front rank as a mining State. The Wood River and Salmon River regions are now attracting most attention, but their prosperity has not yet fairly begun. Fertile valleys, timber-crowned mountains, broad stock ranges, delightful resorts for tourists, and an unsurpassed climate, are Idaho's additional attractions and resources. The Union Pacific Oregon Short Line and the Utah & Northern Division cross the Territory at right angles. All here said extolling Idaho might be repeated respecting Montana, and then the half not be told. The Utah & Northern has had a marvelously magical effect on that magnificent Territory. Immediately it was constructed, the Union Pacific, in pursuance of its settled policy, placed before the world an attractive exhibit of her resources and attractions, to which she responded by doubling her population, wealth, and production in two years. With her rich and varied mineral treasures, vast stretches of natural pasturage, fertile farming lands, and healthful climate, Montana is a most attractive and at the same time practically a virgin field for capital, pluck, and industry. The exhibits of Montana and Idaho at the Exposition will be found worthy of all attention. The Union Pacific Railroad system affords transportation facilities for this

THE GREAT UNION PACIFIC RAILWAY.

Nearly 4,000 Miles in Operation, Crossing Three States and Four Territories.


MAP OF THE
Union & Central Pacific.
RAILROADS.
MATTHEWS, NORTHRUP & CO., ENGRS. & PRS., BUFFALO.
BRITISH POSSESSIONS
WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
UTAH
COLORADO
DAKOTA
NEBRASKA
KANSAS
MINNESOTA
ARIZONA
N. MEX.
PACIFIC OCEAN
CENTRAL PACIFIC
UNION PACIFIC
SAN FRANCISCO
SACRAMENTO
OGDEN
SALT LAKE CY.
DENVER
CHEYENNE
OMAHA
KANSAS CY.
HELENA
PORTLAND
LEADVILLE

The Central Short Line Across the Continent.

The Union Pacific Railway Co.

IS THE

PIONEER LINE

—TO—

Utah, Idaho & Montana

4,000 Miles under One Management.

The territory traversed by the Union Pacific Railway offers to capitalists rare opportunities for invesment in the rich mining camps of its treasure laden mountains; to the tourist, the most majestic scenery in the American continent, as seen in the wild beauty of the Utah canyons and its great Salt Lake, and in the beautiful rivers, valleys and mountains of Idaho and Montana; and

To those Seeking Homes,

these Territories offer superior inducements. The Union Pacific Railway has the most perfect equipment known to modern railroading, and offers to its patrons speed, comfort and safety to all points on its line.

Further information will be furnished on application, in person or by letter, to

S. H. H. CLARK,
General Manager.

THOS. L. KIMBALL,
Assistant General Manager.

J. W. MORSE,
General Passenger Agent.

S. B. JONES,
Asst. Genl. Pass. Agent.

OMAHA, NEBRASKA.

great inter-mountain region. It is pushing its iron way into all the valleys and over all the mountains to the trade and mining centers, assisting in every way their development. The offices of the company are at Omaha, Nebraska. S. H. H. Clark is General Manager; Thos. L. Kimball, Assistant General Manager; J. W. Morse, General Passenger Agent; S. B. Jones, Assistant General Passenger Agent; F. R. McConnell, General Agent at Salt Lake City; any of whom will furnish full and trustworthy information concerning Utah, Idaho, and Montana, free, upon application.

THE UTAH & NORTHERN.

This is a Division of the Union Pacific, starting from Ogden. It runs along the base of the Wasatch about forty-five miles, crosses a low summit into Cache Valley, strikes across eastward to Logan, then north to Franklin, just over the Idaho line; then it escapes, from Cache Valley, and descends the Portneuf to Snake River. It is the only means of access to Northern Utah, and with the Oregon Short Line, to Southern Idaho, the sands of whose principal river for 200 miles in length contain gold enough to make placer mining profitable. Its valley, which is very broad, will some day be a natural wheat field, second only to that of the Red River of the North. The road is intersected on the Portneuf by the Oregon Short Line. They run together down the Portneuf, and part company as they enter Snake River Valley, the Utah & Northern continuing on to Butte, Montana, 420 miles, and thence to the Northern Pacific at Deer Lodge, forty miles further. Seventy-five miles of it are in Utah, and for a goodly part of the distance it runs through a garden.

THE UTAH CENTRAL.

The Union Pacific owns a controlling interest in this road, yet a good block of the stock is held by Utah men, and it is managed by Utah men, John Sharp being Superintendent, and James Sharp Assistant Superintendent. The road extends from Ogden south along the base of the Wasatch, through Kaysville, Farmington, Centerville, Bountiful, Salt Lake City, Sandy, Draper, Lehi, American Fork, Battle Creek, Provo, Springville, Spanish Fork, Payson, Santaquin, Nephi, and Juab, to Milford in Beaver River Valley, with a branch to Frisco, fifteen miles—in all 280 miles. From Ogden to Juab is the best part of Utah. After leaving Juab, the route soon strikes the Sevier River, and following it passes out through the Oquirrh Range on the desert. It is a desert now, but it is underlaid by a stream or reservoir of sweet water, and because it can, for the most part, be made a garden, it ultimately will be. Meanwhile the Sevier River and Clear Lake Springs can be made to irrigate a broad area above and below Deseret. The road is stocked at $4,225,000 in 42,250 shares, and bonded for $4,900,000, all bearing seven per cent. interest. The fixed charges are $343,000. The gross earnings of the road for the year ending June 30, last, were $1,523,006.99 It will be noticed that it is very lightly loaded with liabilities. It can earn its fixed charges, seven per cent. on the stock, and carry a handsome sum to surplus or construction account beside. The company contemplate building a branch road through Spanish Fork Canyon to Pleasant Valley, where they own some square miles of coal, and also an early extension of the line to Iron Mountain from Milford, fifty or sixty miles. From that point, the projected California Central will give an outlet to San Francisco, and south and eastward across the Colorado River, via the Atlantic & Pacific, to the whole South and East. Failing the construction of the California Central (but as Col. Lyman Bridges has undertaken it it cannot fail) the

Utah Central will ultimately go on from Iron Mountain to the Colorado River and the Atlantic & Pacific. It is a fine property and well managed, and although the chances are that it will ere long have a competitor in the Denver & Rio Grande Western, yet there will be so much more to compete for, as experience has a thousand times demonstrated, that it will prove a benefit rather than an injury. It was built without other gift or grant than a right of way over and use of materials from the public lands. The land along the Utah Central is good, and, where it can be watered, well tilled. The towns are embowered in trees. From Ogden to Salt Lake City the scenery is interesting. On the one hand is the Great Salt Lake, with its desolate islands and lifeless waters, full, somehow, of mystery, in spite of all the learned explanations; on the other the Wasatch Mountains, rising abruptly to the region of cloud and storm, ever changing in form and outline as one passes by—varying shade and light and hue, gorge and crag and cliff and towering peak rapidly succeeding each other. But it is idle to attempt to analyze the perpetual fascination of this combination of lake and mountain, orchard, town, and garden. It was of this route in part that the following was written:

"Coming down from Idaho in early May, our train entered this valley, and a scene as of enchantment at the same time. It was about the hour of sunrise. The sky was without a cloud, a vast dome of pearl high-arching over all. The air was the perfumed breath of the early morning and the young spring. Nothing could be fresher, sweeter. The dew hung in jeweled drops from the grass blades and seemed to tremble on the eyelashes of the flowers. Our way lay through vineyards and orchards, farms, gardens, and villages. Brooks tumbled down the mountains, ran along by our side, then sped away into the lake. The farmers were driving afield to their plowing and sowing. The grass and fall wheat could almost wave in the slight breeze; the birds made the meadows and hedges vocal with their morning matins; plums and peaches in full bloom were sprinkled upon the whole country side like flowering shrubs in a park; the tender young foliage of the larger trees seemed to caress the eye that rested upon it. But, in this heart of spring, winter was not far away. Mountains held high their white heads behind us; they towered at our side —an endless snow field, unrelieved for long stretches by a single dark object—whiter than anything else on earth, and beautiful with a beauty which I can find no words to contain or convey. So near, too, it seemed you could put your hand on them. Once in a while a turn in the road would disclose a new horizon of snow caps, high in the upper air, still and solemn, glistening against the sun, almost taking your breath at first sight. A hundred miles of this brought us into Salt Lake, and here these monarchs of old, with white shoulders and foreheads, encompassed us around save in the direction of Antelope Island, and I fancied appeared not uninterested spectators while spring created a new world at their feet, from which she would soon climb their steep sides and give them vestments of flowers for their robes of snow. There was never a lovelier scene, and the ride might have been extended a second hundred miles without running out of it. It was the utmost glory of spring and of winter, that is to say, of life and of death, placed along side by the simple device of a sharp and great difference of altitude. Nowhere else can it be seen to such advantage, in America at least, and it is on exhibition here a month in every year. The spring is indeed lovely in Utah, and these well-watered, well-tilled valleys are none the less a delight and a relief as the season wears on to its height and descends to its close. The effect is enhanced ten-fold by their setting in the heart of a thousand-mile desert full of valleys and jornadas of death, and incapable of being transformed into another Utah, from lack of water."

THE SALT LAKE & WESTERN.

This road leaves the Utah Central at Lehi, thirty-one miles south of Salt Lake City, and runs to Tanner's Springs, in Tintic Mining District, fifty-five miles. It is mainly owned by the Union Pacific, and was intended to penetrate Western Utah, and cross the States of California and Nevada to the Pacific. The proposed route is through the best mining region in the United States, one that has for years turned out, under every disadvantage, ten millions in bullion, yearly. When, if ever, the design of the organization will be executed in full, it is impossible to say. It would furnish an outlet badly needed by Salt Lake City, and also by Nevada. W. W. Riter, of Salt Lake, is the Manager as well as the originator of the road.

SAN PETE VALLEY RAILWAY.

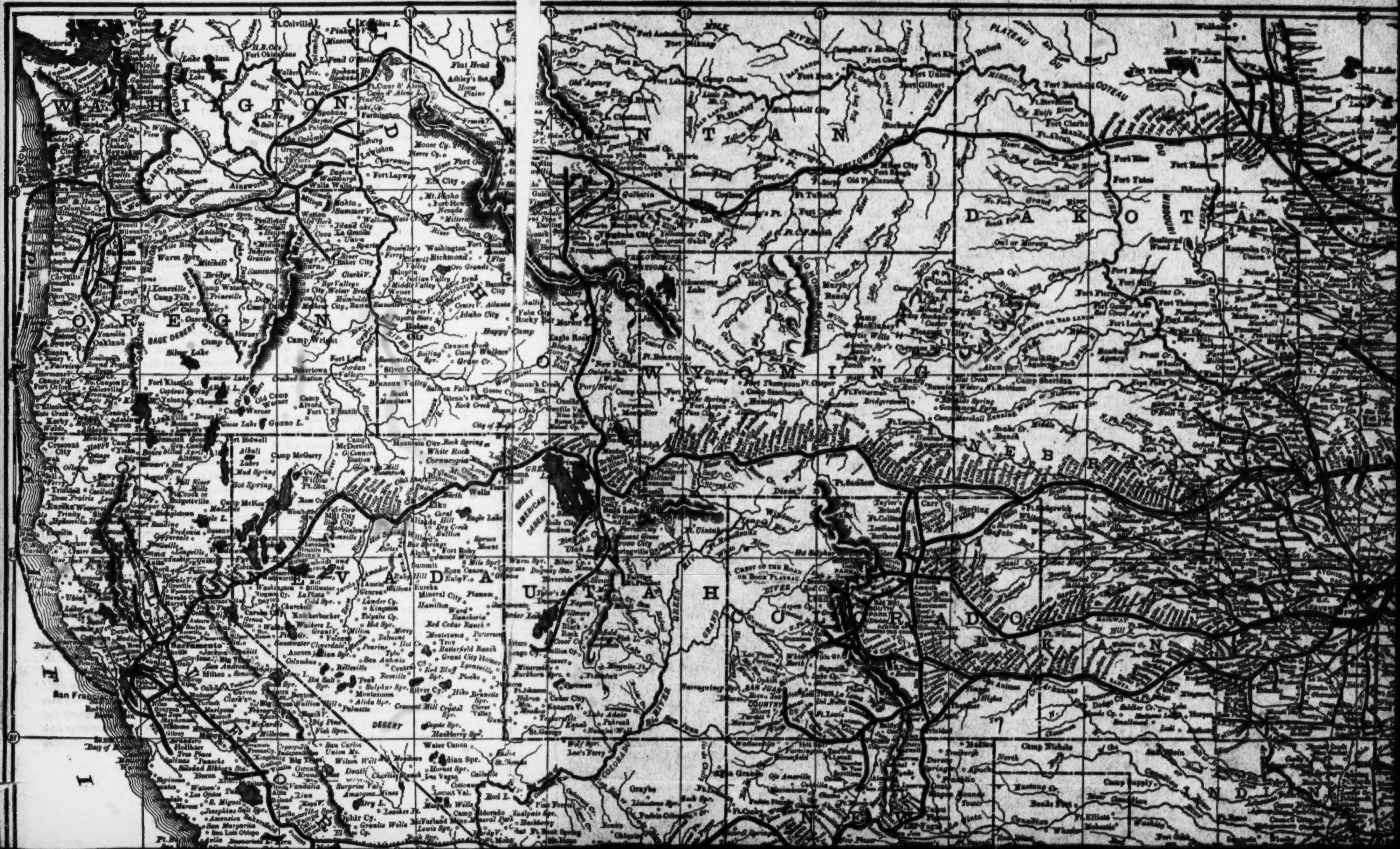
This road leaves the Utah Central at Nephi, passes into Sanpete Valley through Salt Creek Canyon, and thence southward to the Wales coal mines, twenty-eight miles. It was constructed by the English company owning those mines as an outlet for their product. A second company has been organized, called the California Short Line, for its extension southward to Salina, on the Sevier, and northward to a connection with the Denver & Rio Grande Western, at Springville. Sanpete Valley is one of the largest and best in Utah. The Sevier River is lined with settlements, and in the fine country on its headwaters are the Marysvale mines. The road will stimulate all productive industries in the fine sections it penetrates, and soon build up a fine paying business.

THE UTAH EASTERN.

This road connects the coal beds of Chalk Creek (Weber River) with Park City. It was designed to connect them with Salt Lake City, via Parley's Canyon, but somehow the money could not be got to complete it further than above stated. That was mainly done by the Ontario Silver Mining Company, and because, the wood being exhausted in the neighborhood, they had to have coal. The Denver & Rio Grande Western made arrangements to complete the road, and intend to do it after their main line to Salt Lake is completed. There is no doubt that the road would have a fine business—sufficient to pay interest at seven per cent on a million in stock and a million in bonds.

THE ECHO & PARK CITY RAILROAD.

This is a branch of the Union Pacific, determined upon and built the moment the Utah Eastern began work. The two roads run side by side most of the way. The Echo & Park City connects with the Union Pacific, however, while the Utah Eastern does not. So, all the business between Salt Lake City and Park City is done by the Union Pacific. It amounts, at present, to $80,000 to $100,000 a year. It could not run on into Salt Lake, via Parley's Park and Parley's Canyon, but the Utah Eastern can, and one day, not far in the future, will.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SAGE DESERT
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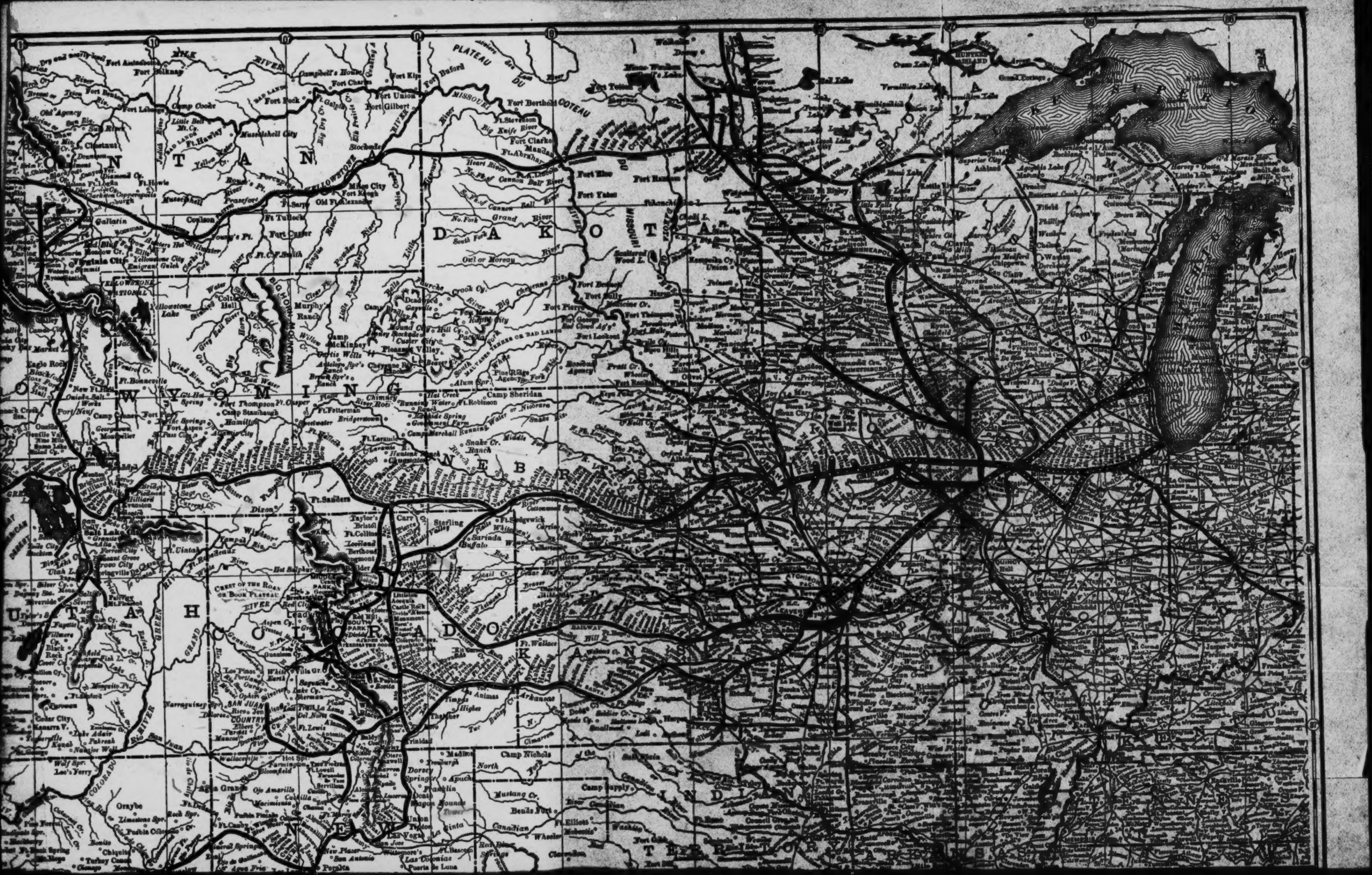
Fort Benton
Salt Lake
Denver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NEW
LAKE SUPERIOR
Fort Belknap
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Fort Union
Fort Gilbert
Fort Peck
Fort Charles
PLATEAU DU COTEAU
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Fort Berthold
Ft. Stevenson
Fort Clarke
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Big Knife River
Ft. Abraham
Heart River
Cannon Ball River
Fort Rice
Fort Yates
Grand River
Owl or Moreau
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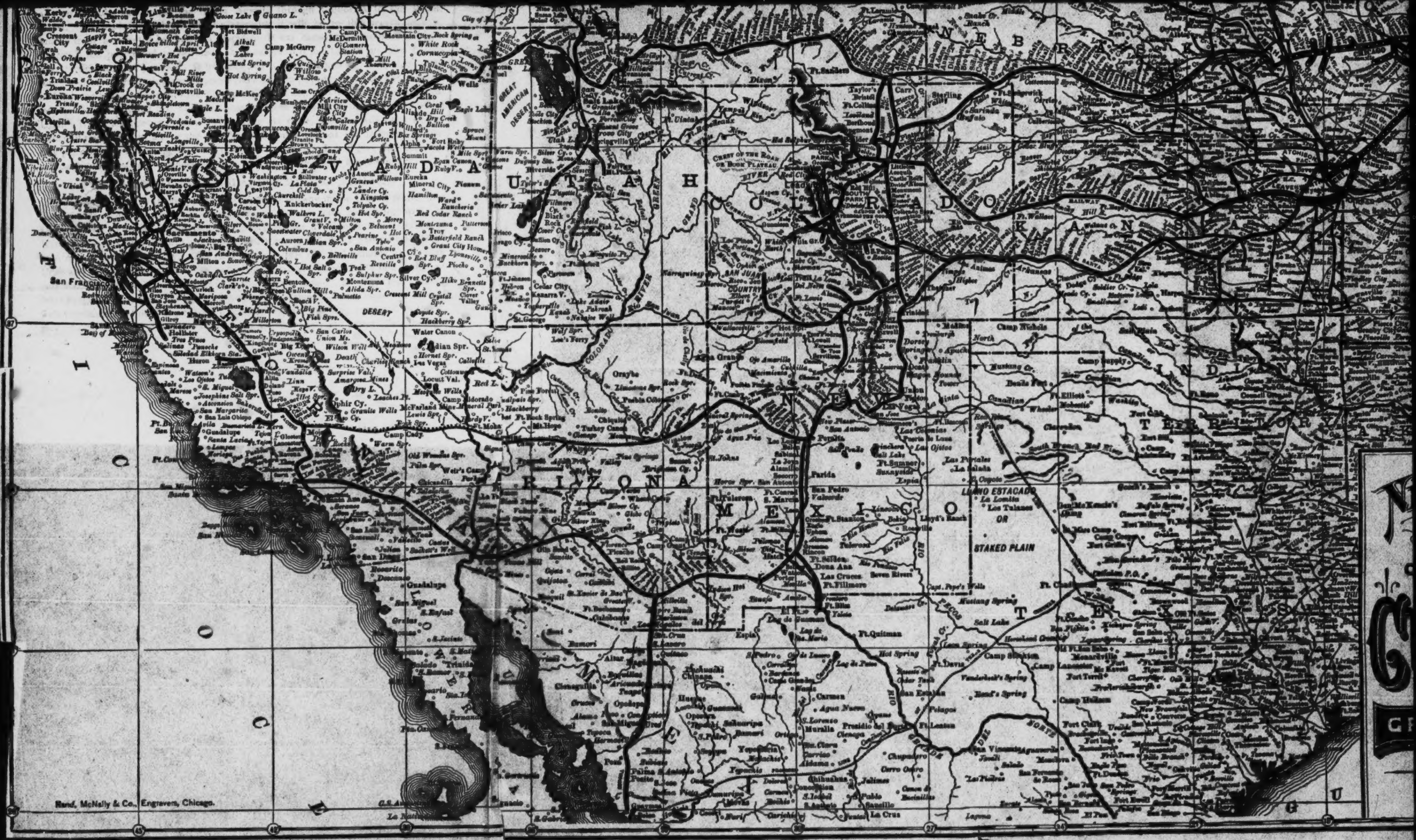
Fort Keogh
Old Ft. Alexander
Ft. Sarpy
Ft. Tulloch
Fort Custer
Ft. C. F. Smith
Powder River
Tongue River
Gallatin
Virginia City
Emigrant Gulch
Yellowstone City
YELLOWSTONE NATIONAL
Yellowstone Lake
Colter's Hell
Murphy's Ranch
Camp McKinney
Crook Cy.
Deadwood
Rapid City
Custer City
Pleasant Valley
Cheyenne River
Fort Pierre
Fort Sully
Fort Bennett
Fort Thompson
Fort Lookout
Pine Ridge Agency
Alum Spr.
Camp Sheridan
Ft. Robinson
Running Water or Niobrara
Snake Cr. Ranch
Ft. Fetterman
Fort Thompson
Ft. Caspar
Camp Stambaugh
Ft. Bonneville
Wind River
Ft. Laramie
Bridgetown
Chimney Rock
Ft. Sanders
Dixon
Taylor's
Bristol
Ft. Collins
Loveland
Berthoud
Sterling
Carr
Sarinda
Buffalo
Ft. Sedgwick
Ft. Uintah
Ft. Bridger
Hilliard
Salt Lake
Utah L.
Provo City
Springville
Fillmore Cy.
Black Rock
Cedar City
Kanarra V.
Lee's Ferry
Orayba
Hot Sulphur Springs
CREST OF THE ROAN OR BOOK PLATEAU
GRAND RIVER
GREEN RIVER
Leadville
Castle Rock
Aspen Cy.
Gunnison
White Earth
Saguache
Lake Cy.
Del Norte
Ft. Lewis
SAN JUAN COUNTRY
Ft. Wallace
Arkansas
Las Animas
Timpas
Thatcher
Trinidad
Camp Nichols
Dodge City
Cimarron
Camp Supply
Ft. Elliott
Canadian
Wheeler
Mustang Cr.
Dorsey Springs
Wagon Mound
Las Vegas
San Antonio
Puerta de Luna
Las Colonias
Agua Grande
Ojo Amarillo
Bloomfield
Farmington
Hunter's Island
Grand Portage
Vermillion Lake
Superior City
Ashland
Quincy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LOWER CALIFORNIA
MEXICO
PACIFIC OCEAN
GREAT AMERICAN DESERT
LLANO ESTACADO OR STAKED PLAIN
SAN JUAN COUNTRY
DESERT
San Francisco
Sacramento
San Diego
Los Angeles
Carson
Elko
Eureka
Pioche
Salt Lake
Denver
Santa Fe
El Paso
Tucson
Prescott
Chihuahua
Guaymas
Dodge Cy.
Ft. Sumner
Ft. Quitman
Ft. Stockton
Ft. Davis
Camp Supply
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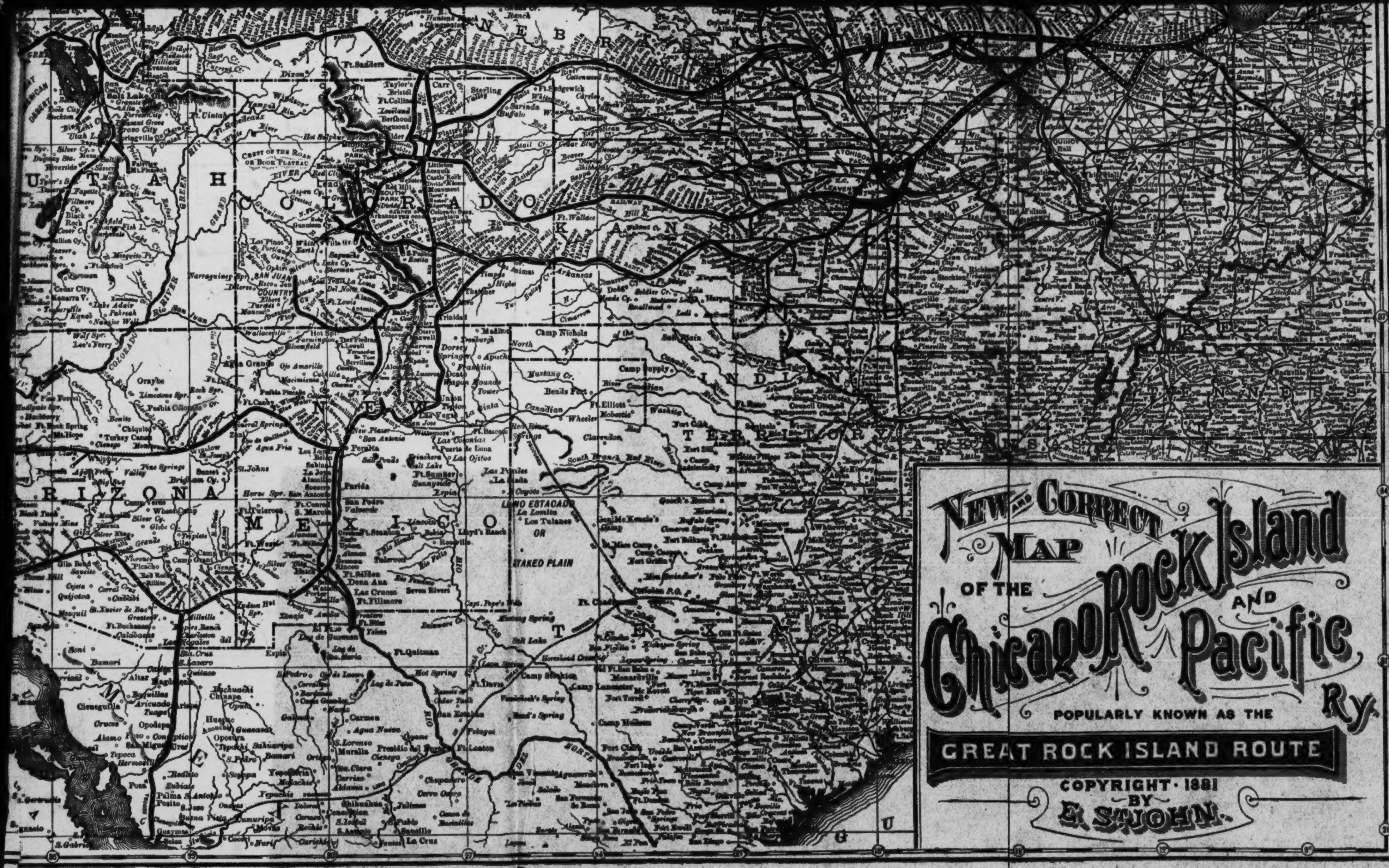
Las Cruces
Dona Ana
Ft. Fillmore
Guadalupe
Rand, McNally & Co., Engravers, Chicago.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Pueblo
Trinidad
Las Vegas
Santa Fe
San Antonio
Ft. Sumner
LLANO ESTACADO
STAKED PLAIN
Camp Supply
Ft. Elliott
Ft. Quitman
Presidio del Norte
Chihuahua
Rio Grande
Pecos
Colorado
Memphis
GU

NEW AND CORRECT MAP OF THE CHICAGO ROCK ISLAND AND PACIFIC RY.

POPULARLY KNOWN AS THE

GREAT ROCK ISLAND ROUTE

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BY
E. ST. JOHN.

THE UTAH & NEVADA.

This road connects the mining districts on the western slope of the Oquirrh Mountains with Salt Lake City. It strikes west across Jordan Valley, and via the southern shore of Great Salt Lake, rounds the end of the Oquirrh, and turns southward to Stockton, about forty miles. Its harvest time is in the bathing season, when its somewhat scanty rolling stock is taxed to the utmost, the only good bathing ground on the lake lying on its route twenty to twenty-two and a-half miles from the city. It was designed as a Nevada road, but the Union Pacific, which owns it, preferred to start one for that purpose of standard gauge and from Lehi.

THE DENVER & RIO GRANDE WESTERN.

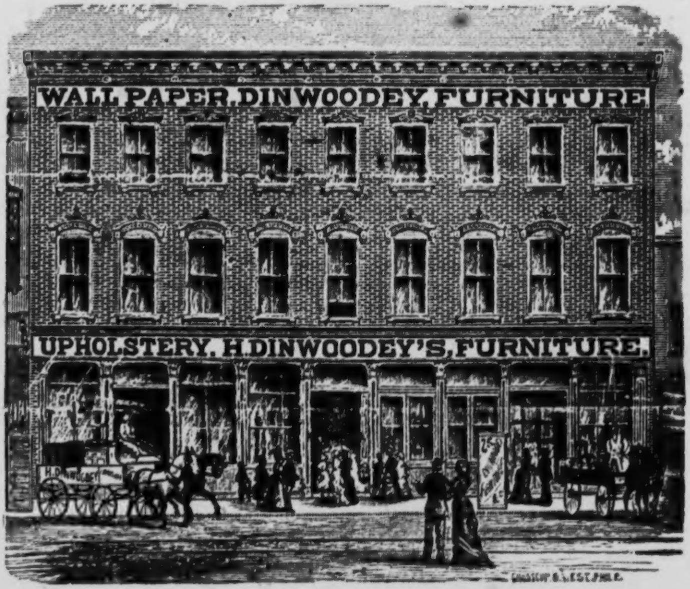
This is a late but welcome comer to Utah. It is the Utah Division of the Denver & Rio Grande system. In 1881, when it first began operations in Utah, it laid out a very extensive programme, filed liens on 2,500 miles of route, put a score of surveying parties in the field, and began construction in several close places, as Parley's Canyon, Salina Canyon, Clear Creek Canyon, the crossing of the Colorado River, and two or three or more passes in Western Utah. This year all scattering work has ceased, and the company's energies are directed to finishing the main line between Gunnison, Colorado, and Salt Lake City. Of this, 274 miles will be in Utah. It will certainly be done within a year, and then, it is probable that a complete system of roads will be constructed in Utah, similar to their system in Colorado, reaching every mining district and every coal and iron bed in the Territory, and stringing all the towns and fertile portions as well. Once in this Basin, it will be impossible to keep this system of mountain roads from extending in the same manner all over Nevada, and across the Sierra Nevada through California to the Pacific Coast. All this is inevitable. What a stimulus it will be to this region may be known from the effect it has had in Colorado: It has caused the resources of every district it has penetrated to be made the most of if it had to call its own friends into the field for that purpose. It has acquired a vast amount of land, coal, iron, town, and other properties, and acquired them only to improve them. It has acquired in Utah the branch roads into the Bingham Canyon and into the Cottonwood (Alta) mines. It has acquired first right in a score of close passes into, inside of, and out of Utah. It has acquired vast coal fields along its route, such as will be a lasting source of revenue to it, and at the same time the price of coal has fallen by almost fifty per cent. on the strength of its operations to date. It will give this Territory competition in eastward business—in fine, will transform it into a new country.

THE CHICAGO, ROCK ISLAND & PACIFIC RAILWAY.

This great road, with equipment second to no railway in the United States, and noted for its ability to make all connections on time, is now connecting with the Union Pacific Railway, main line, at Council Bluffs; its Kansas City Division at Kansas City and Leavenworth, and with the Atchison, Topeka & Santa Fe Railroad at Atchison and Kansas City. The time made by this old and reliable route, from Utah and Colorado points, is as fast as by any route, and there is only one change of cars and that at the Missouri River in a grand union depot. No other route makes less change and no other has as comfortable an equipment, for it consists of roomy, well-ventilated, and neat day coaches, Pullman Palace Sleeping cars, and world-famous dining cars. The fare is always as low as the lowest, and patrons pass through

Established 1857.

HENRY DINWOODEY,


WALL PAPER. DINWOODEY. FURNITURE
UPHOLSTERY. H. DINWOODEY'S. FURNITURE.
H. DINWOODEY

Dealer in all kinds of

Furniture, Carpets,

WALL PAPER, FEATHERS,

Bent Wood School Desks, Building and Roofing Paper,

Parlor Suits, Parlor Brackets, Refrigerators, and Baby Carriages.

A specialty made of WINDOW SHADES and CORNICES, LACE CURTAINS, LAMBERQUINS, and all varieties of WINDOW DECORATIONS.

UPHOLSTERY GOODS.

All kind of Upholstery Work done to order. Carpets made and Laid. Also, a competent Paper-Hanger at

HENRY DINWOODEY'S,

1338 to 1244 First South St., SALT LAKE CITY.

the most fertile and picturesque section of country between the Missouri River and Chicago. Passengers ticketed through to the East have no transfer charge to pay at Chicago, and are sure of close and immediate connections with all lines, East, Northeast, and Southeast. A map of this renowned thoroughfare is published herewith, and commended to the attention of all eastward-bound passengers. No one who purchases his ticket via the Great Rock Island Route will have cause to regret it.

TRADE AND COMMERCE.

In the years preceding the completion of the Pacific Railroads, the imports of Utah, according to the most careful estimate possible, were between 10,000 and 12,000 tons per annum. The exports were almost nothing. The overland emigration, the stage lines, and the troops, bought the farmer's grain and surplus stock, and these were almost the only cash resources of the Territory. The railroad, constructed both from the East and the West, joined tracks on Promontory Summit May 10, 1869, and the same year the Utah Central was built from Ogden to Salt Lake City, connecting the capital of Utah with the trans-continental railroad line. The second year thereafter, the exports and imports of the Territory, as indicated by the books of the Utah Central Railroad Company, were 80,000 tons, a seven-fold increase. Since that they have averaged about 125,000 tons yearly, two-thirds of which were imports, and, about one-half of which (coal in part, coke, charcoal, bullion, lead ores, lead, iron ore, machinery in part) was incidental to mining. Of the rest, the largest items were merchandise, building material, lumber, railroad material, and produce. Sundries includes wagons, live stock, wool, hides, dried fruit, salt, hay, etc. The importation of iron ore and charcoal has practically ceased. The Territory will always have to import its hard and finishing woods, but in this respect it is no worse off than the entire prairie and mountain parts of the country, including the Pacific Coast. It must also expect to always import, more or less, its lumber, sash, doors, blinds, wagons, agricultural implements, and furniture, for not only does it lack the hard and finishing woods of native growth, but the best quality of clear lumber cannot be cut out of native timber. The importation of produce includes corn, oats, some other grains, and seeds; fruits and vegetables from California (out of season); oysters, salmon, fresh fish, and shell fish. The item of live stock embraces livery horses, and blooded horned stock, blooded bucks and swine. The making of leather, or at least of its products, may be expected to increase, as also the manufacture of home-grown wool, and the importation of these kinds of merchandise to correspondingly diminish. Our machinery is largely made here, exclusive of new silver mills, engines of more than 100-horse power, agricultural and railroad machinery. There is no data upon which to strike an accurate balance sheet, but the following is not far out of the way:

IMPORTS.	
Books, stationery, paper, music, musical instruments	$186,000
Clothing, furnishing, hats, caps, carpets, oil cloths	798,000
Cigars, tobaccos, wines, spirituous and malt liquors	615,000
Crockery, glassware, watches, clocks, jewelry	242,000
Dry goods, millinery, fancy goods, notions	1,740,000
Drugs, chemicals, paints, oils, photographer's materials	348,000
Groceries, provisions, canned goods, confectionery	2,135,000
Hardware, stoves, gas fixtures, rubber goods, rope, powder, fuse	960,000
Leather, boots, shoes, harness, saddlery, belting	600,000
Carried Forward,	7,642,000

Brought Forward,	7,642,000
Varieties, sewing machines, brewer's materials, marble, guns	100,000
Grain, feed, fruits, vegetables, seeds, salmon, oysters	100,000
Lumber, sash, doors, blinds, furniture, upholstery	300,000
Wagons, agricultural implements, stock of same	880,000
Coal, coke, charcoal, live stock, machinery, sundries	840,000
Balance	1,566,000
Total	$11,400,000

EXPORTS.

Silver, lead, gold, copper matte	$9,000,000
Wheat, flour, barley, seeds, dried fruit	300,000
Live stock and slaughtered beef	1,000,000
Wool, hides, pelts, tallow, furs and skins	600,000
Eggs, butter, poultry, green fruits and vegetables	400,000
Sundries, fire brick, beer, hauled out by peddlers (estimated)	100,000
Total	$11,400,000

In making this table, no pains has been spared to get at the facts, although it is after all largely an estimate. Returns were solicited and procured from 200 persons and firms engaged in all kinds of business, including all the heavy dealers in the Territory, of the value of their imports and exports, severally, for the calendar year 1878. Twenty per cent., substantially, was then added, to represent the increase in four years. It is believed the balance in favor of the Territory is too small rather than too large, for of the mining output, probably one-fourth goes to non-residents in the shape of profits, while the deposits in the banks have grown from $1,021,491 in November, 1878, to $3,375,974 in November, 1881, and the people are generally better fixed, showing that on the whole they are accumulating a surplus, slowly.

GENERAL BUSINESS.

It is assumed that the amount of business done by jobbers and retailers, annually, would be fairly represented by adding 20 per cent. to the above total of imports, making it about $12,000,000. There is doubtless quite $4,000,000 engaged in the business. No merchants stand higher in the East on the score of credit than those of Utah. Not that they are more upright than other merchants, but from the situation and circumstances a larger percentage of cash than usual is employed in doing the same amount of business. Some of the heavier houses pay cash down altogether. Probably the mean time on all goods bought by Utah buyers would be but little more than double that required for them to make the trip out, say 60 days; and 20 per cent. of their value, delivered, is freight charges, always paid in cash on delivery. There have been but 35 failures, with aggregate liabilities of $650,000, in the last six years, and these were not felt abroad. A good many houses import in a small way, but the weight of the business with the outside is done by a very few houses, which have ample capital and do not require credit. One of the heaviest of these is Zion's Co-operative Mercantile Institution, of Salt Lake City, which, with its branch houses at Ogden and Logan, imports one-third of all the merchandise used in the Territory. It has 800 stockholders and a cash capital of $1,000,000. There is a co-operative institution in nearly every farming settlement, buying in general of the big institution at Salt Lake City, and selling through it the produce they take in trade, but they are not branches. They were organized about twelve years ago and everybody able to earn or buy a share of stock was taken in. Their anxiety to earn and disburse big dividends has created opposition in many places, and in others the large owners in the start have become almost the sole owners. Still they have thousands of stockholders and most of the people patronize them. Fifty insurance companies carry $500,000 insurance on buildings, and $1,500,000 on merchandise in stock, representing, it is estimated, two-thirds of its average value. There are five national and nine private banks, with an aggregate capital of $1,000,000, average deposits, $3,500,000; average loans, $2,000,000; and drawing $30,000,000 exchange in a year.

ENLARGEMENT OF BUSINESS AND TRADE.

Heretofore the trade of Utah has been largely confined within itself, but that is rapidly changing. Its central location and fine climate have always made it more or less the headquarters of the mountain people. This tendency is on the increase. Our citizens are beginning to wake up to the natural advantages of their position; in the centre of the only habitable transverse belt of the mountains, moderate in altitude, with a delightful and salubrious climate, full of rich valleys easily watered, and of mineral mountains covered with timber, and affording limitless pasture and water power; giving rise to a mixed industry, farming, stock-growing, fruit-raising, mining, smelting, and manufacturing; the products being coal, iron, gold, silver, lead; the cereals, fruits, and vegetables common to the latitude; butter, cheese, and various manufactured articles; presenting the natural route of trade and commerce, containing already 160,000 people, and rapidly filling up. They are beginning to see the advantages in a commercial sense of holding the key to such a country, and the tendency to grasp and improve them is growing. Our railroad system is being rapidly extended, drawing after it into an ever widening field our capital, our trade, our manufactures, and business enterprise. Ogden, situated at the intersection of the trans-continental and transverse railroads, has a large trade along the lines of these thoroughfares and in the sections they traverse. There is little agriculture or manufacturing save in this central trough-like depression in the mountains between Nebraska and California, and the adjoining sections, east and west, chiefly mineral or grazing in resources, afford an ample market for Utah's products of all kinds, and a good field for the display of business enterprise and ability. Our citizens are more and more engaging in extensive business operations beyond the confines of Utah, such as mining, smelting, lumbering, and stock-raising, and this naturally enlarges the scope of our commercial influence. Yearly our trade is finding new channels and broadening and extending on every hand the theatre of its operations. All that is needed to give Utah unquestioned commercial pre-eminence among the rising young commonwealths of the mountains is a comprehensive view of the situation and a resolute grasping and improvement of the opportunities it presents.

PUBLIC BUSINESS.*

The receipts from Utah on account of U. S. Internal Revenue taxes have averaged $43,237.50 a year for the twenty years ending June 30, 1882. For the last fiscal year they were $48,512. The expenses of the internal Revenue office in Utah are $6,185 per annum. No spirituous liquors are manufactured, nor any tobacco. About 18,000 barrels of malt liquors, and 230,000 cigars were made in the last fiscal year, worth, together, $250,000, and paying $18,097 revenue. Aside from these

Zion's Co-operative Mercantile Institution

Organized October 16th, 1868.

President,....................................W. H. HOOPER.
Vice President and Superintendent,..............W. JENNINGS.
Secretary and Treasurer,.......................T. G. WEBBER.

Importers and Wholesale and Retail Dealers in

General Merchandise,

SALT LAKE CITY, UTAH.

BRANCH HOUSES AT

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Co-operative Stores and the General Public are invited to select their purchases from our choice and carefully bought stock of

STAPLE AND FANCY GROCERIES,

DRY GOODS AND NOTIONS,

Provisions and Produce,
Crockery and Glassware,
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Pure Drugs and Medicines,
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Carpets and House Furnishings,

IN ALL QUALITIES AND OF LATEST STYLES.

PAPER HANGINGS OF NEWEST DESIGNS.

Duck Suits, Overcoats and Overalls.

two items the bulk of the internal revenue receipts are from special taxes (licenses) and taxes on the capital and deposits of banks. The tax paid by the national banks does not appear in above total.

The Salt Lake City (John T. Lynch, postmaster) Postoffice business and its growth in three years is as follows:

CLASS.	1878	1880
Receipts	$19,821	$31,122
Expense of Maintaining	$11,492	$11,668
Profit to the Department	$8,329	$19 454
Receipts of Money Order Department	$274,775	$841,524
Value of Postage Stamps Canceled	$25,574	$31,275
Letters and Postal Cards Delivered	833,844	1,035,241
Letters and Postal Cards Dispatched	722,540	1,461,235
Pieces of Third and Fourth Class Mail Dispatched,	84,365	142,633
Weight of Total Mail Dispatched	115,141	603,262
Registered Packages Handled	21,835	48,148

The United States Land Office at Salt Lake City was opened in March, 1869, and the following summary of its business thence to June 30, 1882, includes nearly all the lands in the Territory to which the title has either passed out of the Government or been applied for. All moneys for sales, fees, or commissions are paid over to the United States. They are included under the heading of receipts:

ENTRIES, DESCRIPTION OF.	NO.	AREA.	RECEIPTS.
Homesteads, First Entries	5,663	744,969	$81,356.50
Homesteads, Final Proofs	2,017	270,474	11,119.00
Declaratory Statements for Pre-emption	8,080	....	25,827.00
Cash Entries thereunder	2,461	275,161	379,248.65
Desert Entries, First Payment, at 25c	605	116,077	29,021.26
Desert Entries, Final Payment, at $1.00	176	18,142	18,144.28
Agricultural College Scrip	579	92,640	....
Military Bounty Warrant Entries	152	23,835	....
Valentine Scrip Entries	7	280	....
Porterfield Scrip Entries	2	80	....
Supreme Court Scrip Entries	38	1,520	....
Chippewa Scrip Entries	5	400	....
Sioux Scrip Entries	3	367	....
Timber-Culture Entries	140	16,224	1,658.00
Mineral Entries	765	6,659	30,795.50
Coal Land Entries	51	7,688	87,848.50
Declaratory Statements, Soldiers and Sailors	16	....	32.00
Declaratory Statements for Coal Land	578	....	1,734.00
Applications for Mineral Lands	980	....	9,800.00
Adverse Claims Filed	622	....	6,220.00
Timber Depredations	....	....	14,623.41
Total Receipts	....	....	697,431.10

* Title perfected, arable land, 702,123 acres; coal land, 7,688; mines, 6,659; acres entered, but final proofs not made, 572,430; total acres entered, 1,288,900; mine patents received, 337; coal patents, 10.

TAXATION.

There are no debts on account of railroad construction. The revenue law is liberal. Rates of taxation are three mills for Territorial and three for school purposes; counties may levy in their discretion not more than six; towns are restricted to five for ordinary expenses, five for opening, improving, and keeping in repair the streets; while they are all empowered to tax in their discretion to provide water and water-works. Real estate is directly taxed upon assessment of value. Mines and bullion are exempt, but improvements on mines are not. Personal property, although owned by non-residents, is taxed if within the Territory. From taxable credits, debts are allowed to be deducted. Stocks of incorporations whose property is taxable, are exempt. Taxable property, $30,000,000. In no other State or Territory are the taxes so moderate.

EDUCATIONAL.

An annual Territorial tax of three mills is levied for ordinary school purposes, and the school districts may levy such a tax, not exceeding 20 mills per annum, as may be thought necessary for school purposes, if approved by two-thirds of the taxpayers of the district at a meeting called for the purpose. There are about 350 district schools; nominal value of school property, $400,000; children between six and eighteen, 35,000; attendance, 40 per cent.; two terms of 12 weeks each year, one of them paid for by tuition fees, which average $4 a term. Besides the district schools there are the Deseret University, Brigham Young Academy, and about 30 private schools. Also, sustained by the Congregationalists, Presbyterians, Episcopalians, Methodists, and Catholics, 50 mission schools with an enrollment of 4,000, employing 134 teachers at a cost of $60,000 a year, owning school property worth $150,000. Tuition in these schools costs an average of $8 a term, and there are four terms in the year. Some of them are free (to the pupils,) all of them are graded. Nine of them have high school departments, and most of the teachers rank with high school teachers. The Brigham Young Academy and Deseret University are high schools, averaging an attendance of 200 each, and advertising three courses of study—preliminary, scientific, and classical-preparatory. The latter has a library of 2,600 volumes, standard and miscellaneous, a laboratory well supplied with mathematical, philosophical, and chemical apparatus, and a valuable cabinet of minerals and curiosities. It is partly sustained by tuition fees, but the Territory annually appropriates $5,000 toward its support on condition that it give a year's course of normal teaching to 40 representative students from different parts of the Territory. This number nearly covers the average attendance in the normal department.

It may be said, upon the whole, that Utah affords the ordinary educational and religious facilities of the Territories. It has had no assistance, either in land or money, the policy of the Federal Government being to restrict these favors to the States, which need them far less than the Territories. In all the district and higher schools, some scholars are educated free, but not a great many. In the nature of things it cannot be expected. Some of the mission schools have a certain number of scholarships endowed by philanthropic persons, East, notably the Episcopal. The public provision, Territorial, is about $65,000 a year. The districts may be expected to raise half as much more by taxation, enough, say, to give the total school population one term of three months schooling every year. Tuition may be supposed, though it is a rather violent supposition, to provide for another term per year, and that is the utmost that can be expected at present.

No effort should be spared, and in case of the mission high schools, and the Salt Lake Academy, none will be spared, to make them equal in every respect to high schools in the East. Instead of our people sending their boys and girls to the States to finish their education they should supply their own wants in this respect by encouraging their home academies, and also the wants of adjoining Territories. They should also turn out a superior grade of teachers, and by that means keep alive and ever increase the interest in education in this and the surrounding young commonwealths, stimulating the people to greater efforts, to the furnishing of better facilities, better qualified and better paid teachers, and steadily raising the standard of buildings, of text books and apparatus, of the system of teaching and studying. The attention of wealthy people who desire to devote part of their means to the advancement of education is earnestly called to this field. In all the Territory a year's schooling costs, either in taxation or tuition, or both, from $16 to $30 a scholar, probably an average of $20, against $4 in Switzerland and $5 in Germany. No aid in lands has been rendered by the General Government, and none is likely to be until Utah becomes a State. No practicable remedy for this suggests itself. But at the same time, the quality of teaching might be very greatly improved. There are at least five schools in Salt Lake City, to wit: the Rocky Mountain Seminary, the Salt Lake Academy, the Salt Lake Collegiate Institute, St. Mark's, and St. Mary's, that might be enabled by a generous endowment in the ordinary way, to afford teaching at $16 instead of $28 or $30 a year, and to become and maintain themselves as high schools equal to the very best in the country, each sustaining a normal department, and turning out every year a score of finished teachers, almost infinitely better qualified for their duties than the average now teaching in the Territory.

There are published in Utah five daily, twelve weekly, two semi-weekly, two semi-monthly, and two monthly papers, with an aggregate circulation of nearly 30,000 copies. There are four libraries, two Territorial, (one law), one Masonic, the latter managed as a circulating library and having 5,000 volumes, and all steadily growing. There are of benevolent societies probably 200, one or more in nearly every town, nine-tenths of them semi-religious. The Masons and Odd Fellows and Knights of Pythias have 17 lodges in the leading towns, with assets valued at $40,000. The Hebrews have one congregation, one relief, and one benevolent society, with assets of $6,000. Temples of Honor and reform clubs and temperance societies have lodges in the principal towns.

ATTRACTIONS—SALT LAKE CITY.

Of pleasure resorts in Utah Salt Lake City ranks first. Located on the bar of a fine mountain stream which tips it up gently toward the setting winter sun, the streets are spacious and wide apart, bordered with trees and purling brooks, giving ample room for buildings, gardens, orchards, shrubbery, and ornamental grounds. Foliage largely conceals the houses in summer, and as the country is naturally destitute of trees, the contrast is striking and pleasing. The mean summer temperature is about 74, but on account of the dry and rare atmosphere it is not more oppressive than a mean five degrees lower would be on the sea level. Although the mercury often reads above 90 in July and August, sunstroke is unknown, severe thunder and lightning are infrequent, the nights are uniformly cool, and denizens of the city who are obliged to visit the East in the hot months are exceedingly glad to get back again. There is no comparison between the comfort of the average Salt Lake and the average Eastern climate in the same latitude, and it is equally noticeable at all seasons of the year. The mean temperature in winter is about 32, and the Salt Laker often has occasion to felicitate himself on the enjoyment of the pleasantest of winter weather,

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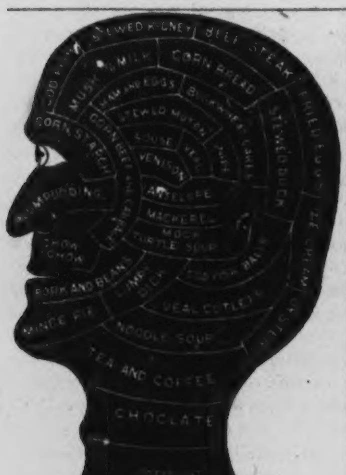
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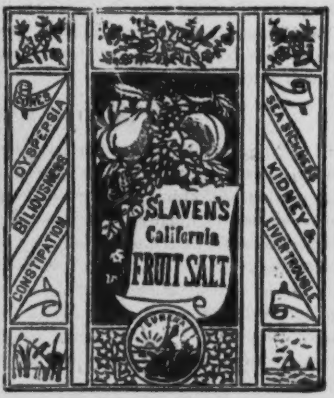
CALIFORNIA FRUIT SALT.


CURES
DYSPEPSIA
BILIOUSNESS
CONSTIPATION
SEA SICKNESS
KIDNEY &
LIVER TROUBLE
SLAVEN'S
California
FRUIT SALT
EUREKA

If You Have Abused Yourself

By over-indulgence in eating or drinking; have Sick or Nervous Headache, Dryness of the Skin with Feverish Tendency, Night Sweats and Sleeplessness, by all mean use

SLAVEN'S FRUIT SALT!

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when the great Eastern railroads are blocked up by snow, or the mercury at the chief centres of population day after day reads from fifteen to thirty below zero. The real winter holds from three to six weeks only. The annual mean is 51°, and a residence in the city is worth the while solely for the agreeableness of the climate.

The city has ample and pleasant hotel accommodations and a good market, ensuring comfort at reasonable prices; it has the electric light, gas, excellent water, supplied from City Creek by means of piping laid under the streets, with frequent hydrants and head sufficient to force it over the tops of the highest buildings; it has churches of the principal Christian denominations and fair schools; twelve miles of street car lines; and two fine theatres. It is peaceful and orderly; taxes are very moderate; and from it the most popular places of resort—the Warm Springs, Great Salt Lake, the Cottonwoods, Bingham and American Fork canyons and Parley's Park, are easily accessible; that is, one can visit most of these places and return the same day if he chooses. The Warm Springs are less than two miles by the street cars from the principal hotels. Salt Lake is reached on the south shore via the Utah & Nevada in twenty miles; on the east shore via the Utah Central in fifteen. One goes to Alta, in Little Cottonwood, by rail in twenty-five miles; thence horseback into Big Cottonwood, Parley's Park, or American Fork. The first two are reached by wagon in a few hours' ride, if preferred; the last by rail to the village of American Fork, and then horses or carriages. Bingham Canyon is the same distance from the city by rail as Alta.

One of the most interesting points in the vicinity is Fort Douglas, a well-built full-regiment post, located on a plateau about three miles east of and 500 feet above the city. The post and grounds are laid out with taste, a small stream of mountain water making the culture of trees, shrubbery, grass, and flowers possible. The elevation gives almost a bird's-eye view of the city and valley. In the distance lies the Dead Sea of America, a blue band drawn along the base of island mountains the vistas between which are closed by more distant ranges. In the north the Promontory divides the waters, ending far out in the lake. Across Jordan Valley the Oquirrh rises to a lofty height, white with snow great part of the year, and often veiled by clouds. On the south low hills appearing to be thrown out in echelon, complete the enclosure of Jordan Valley, which lies an unrolled map at one's feet. An even finer view, and one much sought, is afforded from Ensign Peak, north of the city, one might say at the head of Main Street, although its ascent must be afoot. Amongst the attractive objects in the city are the Tabernacle, a unique structure, with its immense organ and seating capacity of 8,000; the rising white walls of the Temple, 100x200 feet on the ground; the Salt Lake Museum, a valuable collection of Utah minerals and of curiosities from many lands; and the Warm Springs, nicely improved and with commodious buildings and conveniences for all sorts of bathing. There are some good public buildings and many noble private residences and beautiful grounds. A drive round the city and to Fort Douglas is interesting and enjoyable. It might well extend to Emigration Canyon, near the Fort, or to Parley's Canyon, further south. The country on the Cottonwoods, adjoining the city southward, is highly improved for several miles out. The system of city streets, making blocks of ten acres, is extended over this rural suburb, where they become country lanes, and afford delightful drives through cultivated fields, orchards, and improvised groves of trees. Occasionally there is a small sheet of artificial or natural water, which has been improved and beautified with especial reference to the wants of pleasure seekers. Street cars run to Liberty Park, a locust grove of 110 acres, belonging to the city.

It may be doubted, however, whether Salt Lake City affords any pleasure equal to that of perusing the perpetually varying picture presented by the magnificent range of mountains, which rises abruptly to a height of 8,000 feet above the valley, with no accompaniment of foot hills to conceal or dwarf its proportions. Much of the year it is white with snow. In the autumn it wears all the colors of the rainbow in succession as its shrubbery is touched more and more severely by the frosts. In the spring only do its lower slopes present a green appearance. On northern exposures it is dark with pines. Its general summer hue is gray, although its light and shade and color are as variable as the wind that plays about its craggy summits, invades their recesses, and in its persistent efforts to crumble them, has chiseled out gorges in the solid rock thousands of feet deep, giving infinite variety of form and outline. These are but surface aspects, however. The interest in them is ever renewed because they perpetually change with the seasons or with the point of view. The Range gets a deeper hold of one from its suggestions of primary forces and principles, such as had to do with the forming of the globe itself, and are now busying themselves with its destiny. It seems to materialize the idea of endurance, to be the emblem of strength, from everlasting to everlasting the same. Yet it has been gas in the fervent heat of the sun. It has been an ocean of liquid fire. It has been held in solution by primeval seas. They laid its foundations relatively six miles deeper than they now stand. The crust of the earth was broken through when it was upraised and this enormous fault made. The impalpable ether which bathes its lofty heights has reduced them by many miles and will in few years spread its entire mass upon the floor of the ocean where it has rested before. We must look to the sun for immutability, and may not find it even there. "But thou art, perhaps, like me, for a season; thy years will have an end. Thou shalt sleep in thy clouds, careless of the voice of the morning."

The basic rocks of the Wasatch are quartzose, mica, and hornblendic schists. Next above these is a heavy bed of stratified quartzites. Next above, a bed of gray limestone, probably of silurian age, and a group of shales, clays, and quartzites intervenes between this and another limestone formation which belongs to the carboniferous age. The Range extends throughout Utah and far into Montana, but it is seen to greatest advantage from Salt Lake City and from the valley for 200 miles north and south. Its canyons are the result of erosion, and are due to the quantity of snow precipitated upon its higher regions. Many of its summits exceed 12,000 feet in altitude. The Twin Peaks, overshadowing Jordan Valley, rise 12,000 feet above the sea, and the high peak further south to 12,500. Everywhere it is an imposing and picturesque object, but overlooking the Salt Lake Basin from Mt. Nebo to Bear River Gates, it is a Titanic monument of nature's rearing upon which, with incomparable touch, a new picture is painted by the same great artist every day.

GREAT SALT LAKE.

The first mention of Great Salt Lake was by the Baron La Hontan in 1689, who gathered from the Western Indians some vague notions of its existence. He romanced at length about the Tahuglauk, numerous as the leaves of trees, dwelling on its fertile shores and navigating it in large craft. Captain Bonneville sent a party from Green River, in 1833, to make its circuit, but they seem to have given it up on striking the desert on the northwest, lost their way, and after some aimless wandering found themselves in Lower California. Until Colonel Fremont visited it, in 1842, on his way to Oregon, it is probable that its dead waters had never been invaded or the solemn stillness of its islands broken. He pulled out from near the mouth of Weber River in a rubber boat eighteen feet long for the nearest island, which, when he had climbed it and found it a mere rock, as he says, fourteen miles in circuit, he named "Disappointment Island." Captain Stansbury re-christened it "Fremont Island," and by common consent such it is called. Captain Stansbury found neither timber nor water on it, but luxuriant grass, wild onions, parsnips and sego. Near the summit the sagebrush were eight feet high and six or eight inches in diameter.

In the early spring of 1850, Captain Stansbury spent three months in making a detailed survey of the shores of the lake and its islands. He found the western shore a salt-encrusted desert, in traversing which his men more than once well nigh perished for want of water; the northern shore composed of wide salt marshes overflown under steady southerly winds; the Promontory Range projecting thirty miles into the lake from the north, having many sweet water springs around its base, and a good range (now covered with flocks and herds); the southern shore set with mountain ranges, standing endwise to the lake, with grassy valleys intervening—Spring, Tuilla, and Jordan; the eastern shore fair irrigable land. The latter was then already dotted with infant settlements, and was produeing fifty bushels of wheat to the acre. Almost everywhere land and water were divided by mud flats, across which they were forever dragging their boats and packing their baggage.

The principal islands are Antelope and Stansbury, rocky ridges, ranging north and south, rising abruptly from the lake to an altitude of 3,000 feet. Antelope is the nearest to Salt Lake City, and is sixteen miles long. Stansbury is twenty miles to the westward of Antelope, and twelve miles long. Both at that time were accessible from the southern shore by wagon. Both had springs of sweet water and good grass for stock. The view from the summit of Antelope is described as "grand and magnificent, embracing the whole lake, the islands, and the encircling mountains covered with snow—a superb picture set in a framework of silver." Mention is made of the scenery on the eastern side of Stansbury. "Peak towers above peak, and cliff beyond cliff, in lofty magnificence, while, crowning the summit, the 'dome' frowns in gloomy solitude upon the varied scene of bright waters, scattered verdure, and boundless plain (western shore) of arid desolation below." Descending one day from the "dome," "the gorge, at first almost shut up between perpendicular cliffs of white sandstone, opened out into a superb, wide, and gently sloping valley, sheltered on each side to the very water's edge by beetling cliffs, effectually protected from all winds, except on the east, and covered with a most luxuriant growth of bunch-grass. Near the shore were abundant springs of pure, soft water," probably covered by the lake now. There was no sweet water on the western side of the island. Of minor islands, there are Fremont, Carrington, Gunnison, Dolphin, Mud, Egg, Hat, and several islets without names. With the ranges enclosing the valley they present water marks at different heights, one principal one 800 feet above the present lake level, indicating a comparatively recent receding of the waters, either from change of climate or the relative level of the mountains and basin.

In all probability the whole area between the Sierra Nevada and the Wasatch

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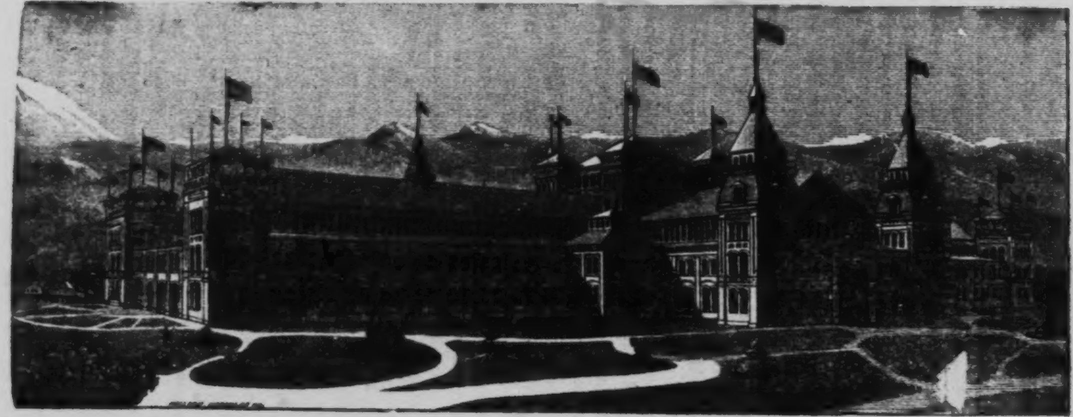

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was once a lake, in which the mountains rose as islands, and of which the lakes now existing, large and small, are the remains. The deposits which cover the lowlands are chiefly calcareous and arenaceous, and often filled with fresh water and land shells, indicating a very modern origin. The formation of the islands and shore ranges adjoining Salt Lake is metamorphic; the strata distinctly marked and highly inclined, but attaining no great elevation; generally overlaid with sandstones and limestones of the carboniferous age, both partly altered, the former constituting the loftier eminences; in places highly fossiliferous, in others, losing their granular character and becoming sub-crystalline, or threaded by veins of calcareous spar; the sandstones often from metamorphic action taking the character of quartz. In places on the islands, the surface is changed rocks, talcose and mica slates, hornblende and sienite. Captain Stansbury found the top of an island twenty miles west of the northern point of Antelope to consist of fine roofing slate. A nail could be driven through it almost as easily as through a shingle. It was in unlimited quantity. On another small island he found cubic crystals of iron pyrites in seams of ferruginous quartz. Near the point of Promontory Range he noticed a cliff of alum shale nearly a mile in length, traversed by dykes of trap, the shale containing numerous veins of very pure fibrous alum. Close by were strata of alum, slate, fine grindstone-grit, sandstone and albite. It is a manganese instead of an alkaline or true alum, but may be substituted for common alum in tanning leather, and also, as a coloring agent in dyeing. Some of the islands are crowned with ledges of black and cream-colored marble.

Captain Stansbury navigated and examined the lake thoroughly, and was often oppressed by its solitude, nothing living in the water, although aquatic birds cover the shores and islands in the breeding season, either carrying their food from the fresh water streams that feed the lake or feeding on the larvæ of diptera, which accumulate in great quantity on or near the beaches. His boat was named the "Salicornia," contracted to "Sally" for common use, but he left no data as to its style and tonnage, except that it was flat-bottomed. Next in order among the navigators of the lake were the Walker Brothers, merchants of Salt Lake City, who sailed a lonesome pleasure yacht for some years. There is now a considerable yachting fleet. In 1868 General Connor built and launched the "Kate Connor," a small steamer, for the purpose of transporting railroad ties and telegraph poles from the southern to the northern shore. The next spring he built a schooner of 100 tons burthen, called the "Pluribustah." These were followed by a pleasure steamer, brought on by John W. Young from New York, and in 1870 by the building and launching of a first-class boat, costing $45,000, by Fox Diefendorf, called at first the "City of Corinne," afterward changed to "General Garfield." This boat is used chiefly for excursions, there being no business to justify Salt Lake navigation. The industries of its shores are not so magnificent, it seems, as those of the Tahuglauk in La Hontan's time, or perhaps railroads serve them better. The "Kate Connor" and her kindred long ago found a resting place at the bottom of the lake.

Though the land in sight is for the most part brown and sunburnt, an excursion on the lake is exceedingly interesting. The reader is supposed to have gone out to the south shore via the Utah & Nevada, the distance being twenty-two miles, and to have embarked at Garfield Landing. Our course is northward, between Antelope and Stansbury. The water is of a beautiful aquamarine, and so clear that the bottom is seen through four fathoms of it. Behind, on shore, are the Oquirrh and Spring

Valley ranges, with Tooele (Tuilla) Valley intervening and rising as it recedes so as to hide Rush Valley, into which the Dry and Ophir canyons open. A few miles from shore the village of Tooele is indicated by an oasis of foliage, while far to the west, under the gleaming Spring Valley Range, high enough to retain a few snow banks, although it is July, lies the village of Grantsville. Abreast of Antelope Island we distinguish grazing herds. If boring on this island would bring plenty of sweet water what a fruit plantation it might be made, with the lake to keep off the frosts.

Between two and three hours out, having passed Stansbury, the view northwestward enlarges, and we might imagine ourselves standing out to sea but for an islet or two breaking the horizon. Through notches in the Cedar Mountains on the west the eye catches the snowy foreheads of the Goshoot and Deep Creek ranges; while on the east the Wasatch rises 8,000 feet, a rugged, massive, gray wall of weather-sculptured rock 200 miles in length. Soon we have run past Antelope and are abreast of Fremont, which may be known by a rock upon its crest, resembling a castle. Continuing northward, we shall soon have the Promontory Range on our left, with the water shoaling from fifteen to six or seven feet in our run of twenty miles, where we enter the channel of the Bear River. Forty years ago Fremont could not enter Great Salt Lake from Bear River in a rubber boat eighteen feet long, for want of water. Now a boat of 250 tons burthen passes from the lake into the river over the bank twenty miles from the lake shore. We can proceed up the river to Corinne, where the Central Pacific Railroad crosses it, but the lake excursions do not extend so far, or even so far as we have come. They usually go out fifteen or twenty miles, far enough to get a good view of the surroundings, and there are few more interesting sights to be seen anywhere, and then return. The steamer "General Garfield" has been dismantled, and is used as a house on the bathing ground of Garfield Landing, but another or others better adapted to the purpose, and still very much less costly, will, one of these summers, appear in its stead.

Great Salt Lake covers an area of 2,500 square miles, and its surface is higher than the average Alleghany Mountains. Its mean depth, probably, does not exceed twenty feet, the deepest place, between Antelope and Stansbury, being sixty feet. The two principal islands used to be accessible from the shore by wagon; but the lake gradually filled five or six feet, from 1847 to 1856, and then slowly receded to its old level. In 1863 it began to fill again, and in four or five years had attained a stage considerably higher than its present level, perhaps four or five feet. In 1875 a pillar was set up at Black Rock, by which to measure this rise and fall, resembling a tide, but having no ascertained time. It is very slight compared with what it formerly was. Prof. Gilbert, of the Geological Survey, says that twice within recent geological time, it has risen nearly a thousand feet higher than its present stage, and, of course, covered vastly more ground. He calls that lake after Captain Bonneville, the original explorer of these regions, whom Irving has immortalized, Lake Bonneville. Causes which learned men assign as producing what they call a glacial period might easily fill the lake until it extended nearly the whole length of Utah. During the last high stage, Prof. Gilbert says there were active volcanoes in it. It is generally agreed that its first outbreak was via Marsh Creek and the Portneuf into the Snake. At the present height of that channel (where the Utah & Northern passes out of Cache Valley) it remained a long time stationary, and then seems to have receded rapidly to a second stationary point, and so on down to its present stage.

There is one very heavy beach mark on all the hills surrounding its extended area, and on the hills which were then islands, and a curious thing is the fact that this beach-mark varies in altitude from 100 to 300 feet, showing that the earth in this valley is still far from having reached a stable equilibrium.

It was once popularly supposed that the lake communicated with the ocean by a subterranean river, which made a terrible whirlpool somewhere on its surface. Needless to say, neither has been found. Receiving so many streams and having no outlet, it has become very saline from concentration and the inflow of salt springs. The saline or solid matter held in solution by the water varies as the lake rises or subsides. In 1842 Fremont obtained "fourteen pints of very white salt" from five gallons of the water evaporated over a camp fire. The salt was also very pure, assaying 97.80 fine. In 1850 Dr. L. D. Gale analyzed a sample of it which yielded full twenty per cent. of pure common salt, and about two per cent. of foreign salts, chlorides of lime and magnesia. Surgeon Smart, U. S. A., analyzed a sample in 1877 and found an imperial gallon to contain nearly 24½ ounces of saline matter, amounting to fourteen per cent., as follows:

Common salt	11.735
Lime carbonate	.016
Lime sulphate	.073
Epsom salt	1.123
Chloride of Magnesia	.843
Percentage of solids	13.790
Water	86.210
	100.

One hundred grains of the dry solid matter contained:

Common salt	85.089
Lime carbonate	.117
Lime sulphate	.531
Epsom salt	8.145
Chloride of magnesia	6.118
	100.

It compares with other saline waters about as follows:

	Water.	Solids.
Atlantic Ocean	96.5	3.5
Mediterranean	96.2	3.8
Dead Sea	76.	24.
Great Salt Lake	86.	14.

And in specific gravity, distilled water being unity:

Ocean water	1.026
Dead Sea	1.116
Great Salt Lake	1.107

The solid matter in the water varies between spring and fall, between dry and wet seasons, and also between different parts of the lake, for nearly all the fresh water is received from the Wasatch on the east. It is the opinion of salt makers that an average of the lake at its present stage would show the presence of seventeen per cent. of solid matter. It is undoubtedly a concentration of the waters of the ocean, in which, as in Salt Lake, says Dr. Smart, the common and magnesian salts are held in solution, while the insoluble lime salts are precipitated to the bottom. Captain Stansbury found by experiment that it answered perfectly for preserving meats.

Within the last few years the lake has become of great interest as a watering place. In the long sunny days of July and August the water becomes deliciously warm,

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and it is much warmer than ocean water a month earlier and later. It is so dense that one sustains himself indefinitely without effort, and vigorous constitutions experience no inconvenience from remaining in it a long time. A more delightful and healthy exercise than buffeting its waves when a little rough can hardly be imagined. But for its tendency to float the limbs to the surface and the necessity of keeping it out of the nostrils, it would afford the best swimming school in the world. As it is, all ages and sexes in Salt Lake are fast mastering the art. Experience has proved its hygienic benefits. Whether it be the stimulating effect of the brine on the skin, of the saline air on the lungs, or the exercise of the muscles involved in swimming, or all of them together, many have come to the conclusion that a few weeks' sojourn on the lake shore in the hot season is absolutely essential to their weathering the year. The lake coast at the north end of the Oquirrh for two or three miles is sandy, soft to the feet, clean and shelving. During the hot months cheap trains leave for the bathing ground daily at the close of business. The run is made in forty minutes, and the excursion, aside from the bathing, is not unpleasant. Some day this shore will be built up with private watering-place cottages, plentifully interspersed by large, airy hotels, with water and trees for the grounds; and it will be thronged in the bathing season as no ordinary seaside resort ever is; for it offers unparalleled attractions in its way—rest, comfort, saline air, and the most delightful and invigorating exercise, calling into play all the muscles. Never tiring, the water is so buoyant; never chilling, it is so warm; free from danger, recreating and invigorating, a tonic for all, a remedy for many ills, health-restoring and strength-renewing. There is a hotel at Lake Point, a large private house at Black Rock, and bathing houses all along the shore. The east shore of the lake, on the line of the Utah Central and Central Pacific railroads, is resorted to for bathing. It is becoming understood that for the renewal of life and energy there is nothing like a few weeks of Salt Lake bathing interspersed with visits to the medicinal springs and the mountain canyons and lakes.

MINERAL SPRINGS.

Of the chemical and thermal, salt, sulphur, soda, and chalybeate springs which abound in all parts of Utah, the Warm Springs of Salt Lake City are best known and most resorted to for comfort or health. Dr. Gale says the water is a Harrowgate water, abounding in sulphur. It is very limpid, having a strong smell of sulphureted hydrogen, and contains the gas both absorbed in the water and combined with mineral bases. Following is an analysis by Dr. Charles T. Jackson, of Boston:

"Three fluid ounces of the water, on evaporation to entire dryness in a platina capsule, gave 8.25 grains of solid, dry, saline matter, as follows:

Carbonate of lime and magnesia	0.240
Peroxide of iron	0.040
Lime	0.545
Chlorine	3.454
Soda	2.877
Magnesia	0.370
Sulphuric acid	0.703

It is slightly charged with hydro-sulphuric acid gas, and with carbonic acid gas, and is a pleasant, saline mineral water, having the valuable properties belonging to saline sulphur springs.'

Issuing from the mountain side in large volume, temperature 95 to 104 degrees, the water is conveyed in pipes into two or three bathing houses, containing plunge, shower, and tub baths, and dressing and waiting rooms. The property is owned and improved by the city. It is connected with the leading hotels by the street cars, and is visited by everybody, the waters being considered very efficacious in the cure of many diseases, paralytic, rheumatic, and scrofulous.

Some other springs in Utah have been improved, and more ought to be. Three miles north of Salt Lake City the Hot Springs boil up from under the rocks in such quantity as to make a lake covering two square miles. The temperature is 128 degrees and the sulphurous fumes are almost stifling. The Red Springs, ten or fifteen miles north of Ogden, are hot waters so impregnated with iron as to kill the vegetation over a large area, and color the ground a crimson red; hence the name. A large building for the use of these springs in any way experience may suggest, chiefly at present for bathing, was erected in 1878. Further north, twelve miles from Bear River Gates, is a group of springs issuing from between strata of conglomerate and limestone, within a few feet of each other, of which one is a hot sulphur, a second warm salt, and the third, cool drinkable water. The volume from these springs is copious, but they run some distance before they become thoroughly mixed, although in the same channel.

Next in point of interest and medicinal value to the Warm Springs noticed above, are the Soda Springs at the great bend of Bear River, in Idaho, reached via the Utah & Northern and Oregon Short Line. They occupy a sort of volcanic basin, some ten miles square, the subterranean fires of which are now nearly exhausted, or else are taking a long resting spell. In the vicinity there stands the crater of a dead volcano and the plain is studded by large mounds built up by the deposit from overflowing waters whose sources have now generally failed. The vegetable petrifactions of a spring or group of springs now nearly extinct, make a high mound covering a square mile. Not far off there is a sulphur pool, and the effervescence of sulphur covers acres many feet deep.

Steamboat Spring exhibits to the best advantage the dying throes of the old volcanic forces. It is a circular opening in solid rock two feet in diameter, resembling a huge kettle, the water boiling up vigorously in the center and falling over the sides. Carbonic acid gas is given off freely from this spring and adjoining fissures in the rock, with deadly effect, and with a noise like the discharge of steam from a locomotive, hence the name. These springs were a place of resort in Captain Bonneville's time, and Fremont describes the locality and the springs at length, finding both, as he says, very interesting. He found a great many springs similar in quality to Steamboat Spring, having a pungent and disagreeable metallic taste, leaving a burning sensation on the tongue. The rocky deposit from this water was 92.5 per cent. lime.

Of an entirely different character are the Beer Springs, of which there are also a great many, bubbling up everywhere, even in the river, as was indicated by the carbonic acid gas given off. One quart of this water Fremont found to contain:

	Grains.
Sulphate of magnesia	**12.10**
Sulphate of lime	**2.12**
Carbonate of lime,	**3.86**
Carbonate of magnesia	**3.22**
Chloride of calcium	**1.33**
Chloride of magnesium	**1.12**
Chloride of sodium	**2.24**
Vegetable extractive matter	**.85**
	29.84

The carbonic acid, originally contained in the water, had mainly escaped before it was subjected to analysis, and was not, therefore, taken into consideration.

Later visitors say the waters resemble in taste the Congress water of Saratoga. Though somewhat unpleasant at first, this rapidly wears away by use. They are delightfully cool, and with the addition of a little lemon and sugar make a beverage equal to the soda water of commerce. There are a dozen active groups of springs within a radius of two miles. Carbonic acid gas constantly bubbles up to the surface with something of the sparkle and gurgle of a soda fountain, and it escapes so rapidly that it can hardly be bottled and corked with the water.

The mineral constituents of these waters render them the best of alteratives, and they are very efficacious in scrofulous and glandular difficulties, and generally in all diseases of the skin. They are also an excellent diuretic and contain enough iron to give them great value as a tonic. The place is a favorite summer resort for invalids and others, and there are many persons in Utah who have experienced decided benefits from the use of the waters. The altitude is about 6,000 feet and the climate is all that could be wished. The warmth of summer is tempered by the coolness of the nights, frosts occurring in every month of the year. The atmosphere has the dryness common to the mountains and is therefore favorable for consumptives and those afflicted with pulmonary diseases. The scenery is equal to any in the Territories, there are many things of interest in the vicinity, and the streams are full of trout. There is a town laid out and a dozen or twenty buildings, but there is little or no agriculture. Stock raising, dairying, and wool growing, are the main pursuits of the inhabitants.

THE WASATCH CANYONS.

The Wasatch Mountains like other great chains are in many places a series of parallel ranges enclosing the heads of lateral streams, which canyon only occasionally in breaking through into the Great Basin or the Colorado River or Snake River basins. The divide between the waters flowing into the Colorado and the Great Basin is crossed by the Union Pacific Railroad at Reed's Summit, 7,463 feet above the sea. Descending a few miles it crosses Bear River at an altitude of 6,969 feet, here flowing generally northward, follows it down ten miles, leaving it 6,656 feet above the sea, thence surmounting Echo Pass, 6,785 feet in height, it begins the direct descent into the Great Basin through Echo and Weber canyons, crossing Weber River at an elevation of 5,240 feet, and striking the level of Salt Lake at Ogden, 4,290 feet. Echo Canyon is no canyon in the true sense. A wall of sandstone rises perpendicularly on the north 300 or 400 feet; on the south there is no wall and little rock, but a succession of grassy ridges sloping smoothly toward the stream. It strikes Weber River, another northward flowing stream, about midway of its course, and the railroad follows it down through a valley for five or six miles below Echo City to the "Thousand Mile Tree," where the mountains draw together and the first canyon commences. The valley suddenly narrows to a gorge, the rended rocks tower to the sky and almost overhang the train. Through tunnels and over bridges this is cleared in half a dozen miles, the mountains recede again and soften down into mere hills in comparison. An oval valley like the one above is passed, the mountains again close in on the river, and the train enters Devil's Gate Canyon, where the naked rocks rise half a mile in the air. Ages ago they presented a fixed rock dam which it seems the river could never have conquered, but it has, and through the passage made by its

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persistence, the road soon emerges from Devil's Gate into the summery airs of the valley. The scenery has been described and illustrated until the traveling public is familiar with it. But one gets only a slight idea of its beauty and grandeur from a ride through it on the rail. He must stop off, and on foot or horseback explore the side streams and reach various elevations half a mile above the river before he can be said to have seen it at all.

Bear River flows a long distance northwards before it find a passage outward into Cache Valley, and thence into Salt Lake Valley. Similarly the Provo, rising near the sources of the Weber, and flowing southward, has its Alpine valleys, and finally canyons out into the basin. So with the Sevier, and its affluents, and so to a less extent the various minor streams that flow westward into the basin directly from their sources, as Logan and Blacksmith forks, Box Elder Creek, Ogden River, the Cottonwoods, American and Spanish forks, and a great many others. One can see something of their beauties in hastily passing through them, but to get the full benefit of them he must have a camp outfit, his own conveyance and time, saddle horses, hunting and fishing tackle, and all the paraphernalia of the sight-seer, the tourist, and the sportsman. For such it is hard to select the locality since the Wasatch Range affords such an endless variety from end to end.

Cache Valley is an inviting field for the tourist. It is literally *cached* among the ridges of the Wasatch, like Sanpete, Ogden, Alpine, Morgan, Echo, Rhoades, and Sevier valleys; and is as though, round a symmetrical oval area ten by fifty miles, the mountains had risen or ranged themselves at some mysterious bidding to show what could be done in the way of valley making. It is about 4,500 feet above the sea, copiously watered, enclosed by mountains 8,000 feet high, in whose gorges the snow lies till August, their sloping sides meanwhile invaded by the lively green of the valley, which creeps in bands to their summits between the snow banks, or appears in sunny places among the scattered pines and dark points and ridges of rock. A fair sprinkling of forest would perfect it, but this it lacks, and the green of valley and mountains only relieves the eternal gray-brown of everything, after all. The range on the east is the main Wasatch, deeply notched by the streams, which are alive with trout and afford passage over fine roads to Bear Lake Valley, fifty miles eastward. Where the rivers emerge from their canyons and rush laughing into the sunshine their waters are caught up and led in a thousand trickling rills to bless the fields with fatness. Some lighter streams and springs perform the same kindly office for the west side, and so there is a belt of cultivated land dotted with towns all around the edge of the valley. Of these Logan is the largest, Smithfield the prettiest. From the summit of the divide crossed by the Utah & Northern, Cache Valley is a pretty sight. One can drive on fine roads all round it. It is central to Soda Springs, and Bear Lake, and there are good roads over hill and dale southward into Salt Lake Valley via Box Elder Creek or Ogden River.

The same section may be penetrated almost as well from Ogden. Of the interesting places in the immediate vicinity of Ogden, the canyon of Ogden River ranks highest. There is a good carriage road through the canyon, which is ten or twelve miles long, and the passage presents the same variety of immense, close, towering rocky walls, broken apart by the full roaring stream, common to all the Wasatch canyons. Power of resistance on the one hand and of attack on the other are well symbolized. There are minerals and mineral springs along the way. Through the outlying range one enters Ogden Valley, an enclosed park, with its settlements and farms, beyond which the drive extends into both Bear Lake and Cache valleys. All the streams in that part of the Territory afford good sport for the angler, and the valleys and hills are grass grown and alive with grouse and snipe, sage hens and prairie chickens.

From Salt Lake City, Parley's Park, Big Cottonwood Lake, and American Fork Canyon are the favorite resorts. The park is about 25 miles from Salt Lake City, just over the crest of the Wasatch on the sources of the Weber and nearly as high as the mountains themselves. The road ascends through Parley's Canyon and is a fine drive. There is a hotel in the park, but visitors usually prefer taking along with their team their own camping outfit. The elevation ensures refreshing coolness especially of the nights. The park is quite extensive in area, affords good drives, fishing and hunting, stretches for horseback riding; and among other objects of interest, Park City and the Ontario mill and mine. One can get a fair idea of the ways and means of mining by a visit to this town, mine, and mining district. Excursions may be made eastward to the sources of the Weber and Provo rivers, the whole region being full of interest. It is an old formation, apparently, giving evidence of the mighty action of water or ice or both, geological ages ago.

There are a series of small lakes at the head of Big Cottonwood, at the most picturesque of which, namely Mary's, Mr. Brighton has built a hotel for the accommodation of summer visitors. For many years it has been a famous mountain resort, and the number of persons seeking its cool fresh air and the enjoyment to be derived from a study of nature in its grandest aspects, is yearly increasing. The hotel is always full during the hot months, and the lake bordered all round with the tents and wagons of campers. Excursions must be afoot or horseback. They may include visits to Park City, to Heber City, Midway, or Kamas; to the Big and Little Cottonwood mines, to other rock-bound tarns, and to sightly peaks. From any of these one can look out over Jordan Valley, the lower section of the Oquirrh, Rush Valley, and in clear weather, upon the far summits of the Deep Creek Mountains, glittering like silver points in the dim distance. Perhaps the finest view is from Bald Peak, among the highest of the Range. Standing on its top, twenty thousand square miles of mountains, gorge, lake, and valley may be swept by the eye. Eighty miles south Mount Nebo bounds the view. Beneath lies Utah Lake, a clear mirror bordered by gray slopes, and Salt Lake City embowered in foliage, with Salt Lake rolling its white caps and glittering in the sunshine beyond, i's islands and all the valley ranges dwarfed to hills. Northward the higher points of the Wasatch catch the eye until they are lost in the distance. Eastward the sources of the Weber and Provo fill the foreground, while successive mountain ranges bound the view in that direction. Words can give but a faint idea of the magnificence of the outlook from Bald Peak, or Kesler's Peak, or Mount Clayton, the corner of three counties, and from whose bare sides start Snake Creek, the Cottonwoods, and American Fork, or any other of the higher summits in the vicinity of Mary's Lake.

South of the Cottonwoods, American Fork Canyon opens into the Utah Lake Basin. It has been called the Yosemite of Utah, and undoubtedly its succession of wild gorges and timbered vales make it the most picturesque and interesting of any of the canyons of the Wasatch. Formerly a narrow gauge railroad, intersecting the Utah Southern at the village of American Fork, 32 miles south of Salt Lake City, enabled the visitor to see a part of it with little trouble. The road was unprofitable and was therefore taken up in 1878 and laid down in Spanish Fork Canyon, further south. To visit it now one must take horse or carriage at American Fork, and the better way will be to take along a complete outfit for camping, although there are buildings at Deer Creek and at Forest City. The railroad never extended further than Deer Creek, twelve miles. Here one takes horses, eight miles, to Forest City, and then the ascent to the Miller mine, or the Silver Bell, begins. It is four miles further, the mines being 11,000 feet in altitude. Once there, it is but a short climb to the top of the peak, nearly as high as any of the Range, and affording a most magnificent and almost unbounded view in fine weather.

This canyon is noted not only for the towering altitude of its enclosing walls, but for the picturesqueness of the infinite shapes, resembling artificial objects, towers, pinnacles, and minarets chiefly, into which the elements have worn them. At first the formation is granite and the cliffs rise to a lofty height almost vertically. Then come quartzite or rocks of looser texture, conglomerates and sandstones, the canyon opens to the sky and you enter a long gallery the sides of which recede at an angle of 45 degrees to a dizzy height, profusely set with these elemental sculptures in endless variety of size and pattern, often stained with rich colors. "Towers, battlements, shattered castles, and the images of mighty sentinels," says one, "exhibit their outlines against the sky. Rocks twisted, gnarled, and distorted; here a mass like the skeleton of some colossal tree which lightning had wrenched and burnt to fixed cinder; there another; vast and overhanging, apparently crumbling and threatening to fall and ruin." At Deer Creek the canyon proper ceases, the road has climbed out of it, 2,500 feet in eight miles. This is the main resort of pleasure parties. Since the railroad was taken up, its bed has become a wagon road, which continues to Forest City, eight miles above. The surroundings are still mountainous, but there are breaks where the brooks come in, grassy hills, aspens and pines. Forest City has been a great charcoaling station for many years.

To the sublimity of the canyon scenery in summer an indescribable beauty is added in the autumn, when the deciduous trees and shrubbery on a thousand slopes, touched by the frost, present the colors of a rich painting and meet the eye wherever it rests. To get the full benefit of this, one must go up and up till there is nothing higher to climb. In winter another and very different phase succeeds. The snows, descending for days and days in blinding clouds, bury the forests and fill the canyon. Accumulating to a great depth on high and steep acclivities, it starts without warning and buries in ruin whatever may be in its track. Hardly a year passes that miners and teamsters, wagons and cabins are not swept away and buried out of sight for months. The avalanche of the Wasatch is as formidable as that of the Alps. Probably 40 feet of snow falls on the main Range every winter. Seven miles of tramway in Little Cottonwood Canyon are closely and strongly shedded for defense against snow-slides. Even this is not always effectual. Yet the main traveled roads over this Range, whether wagon or railroads, are but little obstructed by snow as a general thing.

Utah Basin has been treated as a part of Salt Lake Basin, but it is shut off by a low range cut through by the Jordan River and run through by the Utah Southern Railroad. Its prettiest feature is a sheet of sweet water thirty miles in length and about ten in breadth, with broad grassy slopes from the water's edge to the feet of

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enclosing mountains. It receives the American, Provo, and Spanish rivers, and discharges into Great Salt Lake through the Jordan River. It abounds in fish, principally speckled trout, of large size and good flavor. This made it a noted resort of he Utah Indians in former days, after whom the lake, the county, and the Territory seem to have been named. It is a pity the other Indian names of springs and creeks in this pretty basin have not been likewise preserved—Timpanogas, Pomontquint, Waketeke, Pimquan, Pequinnetta, Petenete, Pungun, Watage, Onapah, Timpa, Mouna, and so on. They have all been superseded and their memory is fast passing away as the Indians themselves have done.

"On the Timpanogas (Provo) bottoms," said Lieutenant Gunnison, thirty years ago, "wheat grows most luxuriantly, and the root crops are seldom excelled. A continuous field can be made thence to the Waketeke (Summit) Creek, and the lovely Utah Valley made to sustain a population of more than 100,000 inhabitants. The field was long since made, and the population now numbers 15,000. The principal town is Provo, on the Timpanogas, under the overshadowing Wasatch. It is like all the better class of towns in Utah, regularly laid out, and an accumulation of garden spots, every house half hidden by the foliage of fruit trees and vines. Provo is about fifty miles by rail south of Salt Lake City, and is a good outfitting point for the tourist. The principal attractions in the vicinity are Utah Lake and the Provo River. The latter has the inevitable canyon, above which a fine carriage road leads through a succession of settled Alpine valleys to Kamas Prairie, which Captain Stansbury describes as "a most lovely, fertile, level prairie, ten or twelve miles long and six or seven miles wide," where the affluents of the Provo and Weber interlock. The drive may proceed down the Weber to Ogden if one desire, with the same alternation of land-locked valleys and mountain gorges. A dozen thriving settlements will have been passed through en route.

Six miles south of Provo is Springville, where the Denver & Rio Grande Western Railroad may be taken up Spanish Fork into the finest timbered, tallest grassed, best watered section of Utah, presenting a fresh field for hunting and fishing. All along here the Wasatch Range presents a most interesting aspect, and frequently offers access via canyons of more or less attractiveness. An isolated ridge trending north and south, west of the lake, divides the basin into separate halves, cutting off Cedar and Goshen valleys, dry for the most part and of little account, sloping gradually up for twenty miles to the summit of the Oquirrh, 6,000 feet high, on the western side of which are the Tintic mines.

Utah Lake Basin may be said to end in the vicinity of Nephi, under Mount Nebo, where Onapah (Salt Creek) Canyon opens the way for another side railroad into Sanpete Valley, with its eight or ten settlements and 10,000 to 12,000 inhabitants. From the head of Sanpete one may find his way northward into Spanish Fork, or eastward over a mountain into Thistle or Castle valleys. Southward the valley opens on the Sevier River, a world in itself, with passes of the most majestic grandeur through ranges on either hand into adjoining valleys. A journey up the Sevier in fine weather is very interesting, and so is the region about its heads, where the waters divide and flow apart. The town of Kanarra marks the very crest of the rim, the waters flowing from the village north and south. The character of the Colorado scenery is well known. A high sandstone plateau, cut by the river and side streams a mile in depth, too diy for animal or vegetable life, worthless for the most

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part unless for minerals. The river is hardly navigable above Fort Yuma. The scenery is described as more terrible than beautiful, and traveling through the country as difficult, if not dangerous.

The physical features of Utah, mountain and desert and salt sea, are peculiar and of perennial interest. The Territory has all the resources of an empire within itself. Its climate is healthful and agreeable. It is in the heart of the mountain country. Railroads radiate hence to the four cardinal points. The great routes of inland commerce, between the oceans, and between Mexico and British America, intersect at Ogden. The valleys are of inexhaustible fertility and the mountains full of minerals. The farms and mines are but a step from each other. Every valley and mining canyon has its railroad and its rushing stream. Labor and food are as cheap as they ever ought to be. No better mines or facilities for working them exist anywhere. There is no more handy or profitable market for the farmer. There is unlimited water power, and a fine start in manufacturing has been made. Timber, coal, iron, and good building stone are everywhere. Nature has richly endowed the Territory in many respects. A hardy and industrious population of 160,000 is on the ground. No State or Territory offers greater inducements to the enterprising capitalist, artisan, laborer, or farmer.

POLITICAL.

There has been an immense advance in Utah since the war period, and it is believed that the people and the times are ripe for the operation of effective legislation for the suppression of polygamy, and the general Americanizing of the laws and institutions of the Territory. If the Election Commission provided for in the Edmunds bill shall fail to secure a Gentile Legislature, it will at least secure a monogamous Legislature; and if that proves to be refractory, Congress will be urged to create a Legislative Commission to supersede the Territorial Legislature. This Commission will establish such laws as prevail in the other Territories and American States, and will so place power for a time as to hold these laws intact. Men and things will then adjust themselves gradually to the new laws, as to an accomplished and irreversible fact, and as being right, also. A few years will inevitably bring a majority of the people to the support of the new order of things, when Utah can safely be admitted as a State. Polygamy will gradually withdraw into the past, and a freed people will require their church to confine the use of its machinery to spiritual concerns, leaving politics and business to their natural development. Nobody in Utah expects any disturbance in the accomplishment of this peaceful revolution, and it may be added, that the universal disposition is to interfere as little as possible with the past, provided the desired change for the future be acquiesced in as far and as fast as possible. Of course, with this revolution well under way, an influx of people and money into Utah is expected, such as Colorado has experienced since she became a State in 1876. It is quite as rich in resources as Colorado, and enjoys a better climate. Americanized, it will be the most attractive of any of the Rocky Mountain States or Territories.

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